

PEEL REGIONAL POLICE, DIVISION 12
Interior and Exterior Renovations

4600 Dixie Road
Mississauga, Ontario

Project Number: 250512

SPECIFICATIONS

Axia Design Associates Inc.
May 2026

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END OF SECTION

Architect (A)
Electrical Consultant (E)
Landscape Consultant (L)
Owner (O)

Civil Consultant (C)
Hardware Consultant (H)
Mechanical Consultant (M)
Structural Consultant (S)

1 GENERAL

1.01 DIVISION OF WORK

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

1.02 SPECIFICATIONS LANGUAGE AND STYLE

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

1.03 CONTRACT DOCUMENTS FOR CONSTRUCTION PURPOSES

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

1.04 DOCUMENTS AT THE SITE

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

1.05 CONTRACTOR'S USE OF PREMISES

- .1 Except as otherwise specified, Contractor has unrestricted use of Place of the Work from time of Contract award until Ready-for-Takeover.
- .2 Confine Construction Equipment, Temporary Work, storage of Products, waste products and debris, and all other construction operations to limits required by laws, ordinances, permits, and Contract Documents, whichever is most restrictive. Do not unreasonably encumber Place of the Work.

END OF SECTION

1 GENERAL

1.01 CASH ALLOWANCES FOR SUPPLY AND INSTALLATION OF PRODUCTS

- .1 Amount of each cash allowance includes:
 - .1 All costs to provide the specified Products, including supply, installation, and related costs, excluding Value Added Taxes.
 - .2 Subcontractor's and sub-Subcontractor's overheads and profits related to the cash allowance.
- .2 Amount of each cash allowance does not include Contractor's overhead and profit, and other related costs, which shall be included in the Contract Price and not in the cash allowance.
- .3 Allow the stipulated sum of \$ 120,000.00 for the rental and installation of trailer(s).
- .4 Allow the stipulated sum of \$ 50,000.00 for the supply and installation of electrical to the trailer(s).
- .5 Allow the stipulated sum of \$ 50,000.00 for the supply and installation of landscaping and irrigation systems.
- .6 Allow the stipulated sum of \$ 50,000.00 for the diversion and dewatering of storm service.
- .7 Allow the stipulated sum of \$ 25,000.00 for the relocation of grounding rod system.

1.02 CASH ALLOWANCES FOR SERVICES

- .1 Amount of each cash allowance includes:
 - .1 All costs related to the services, excluding Value Added Taxes.
 - .2 Subcontractor's and sub-Subcontractor's overheads and profits related to the cash allowance.
- .2 Amount of each cash allowance does not include Contractor's overhead and profit, and other related costs, which shall be included in the Contract Price and not in the cash allowance.
- .3 Allow the stipulated sum of \$ 25,000.00 for Testing and Inspection services.
- .4 Allow the stipulated sum of \$ 100,000.00 for provision of security services.

1.03 EXPENDITURE OF CASH ALLOWANCES

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

- .2 Owner, through Consultant, may request Contractor to identify potential Suppliers or Subcontractors, as applicable, and to obtain at least three competitive prices for each cash allowance item.
- .3 Owner, through Consultant, may request the Contractor to disclose originals of all bids, quotations, and other price related information received from potential Suppliers or Subcontractors.
- .4 Owner, through Consultant, will determine by whom and for what amount each cash allowance item will be performed. Obtain Owner's prior written approval in the form of a Change Order before entering into a subcontract, amending an existing subcontract, or performing own forces work included in a cash allowance. Upon issuance of the Change Order, the Contractor's responsibilities for a cash allowance item shall be the same as for other work of the Contract.

END OF SECTION

1 GENERAL

1.01 DEFINITION

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

1.02 SUBSTITUTION PROCEDURES

- .1 Contractor may propose a Substitution wherever a Product or manufacturer is specified by proprietary name(s), unless there is accompanying language indicating that Substitutions will not be considered.
- .2 Contractor may propose a Substitution wherever a Product or manufacturer is specified by proprietary name(s) and accompanied by language such as "or equal", "or approved equal", or other similar words. Do not construe such language as an invitation to unilaterally provide a Substitution without Consultant's prior acceptance in writing. Do not order or install any Substitution without a Supplemental Instruction or Change Order.
- .3 Provided a proposed Substitution submission includes all of the information specified in this Section under Submission Requirements For Proposed Substitutions, Consultant will promptly review and accept or reject the proposed Substitution.
- .4 Consultant may accept a Substitution if satisfied that:
 - .1 the proposed substitute Product is the same type as, is capable of performing the same functions as, interfaces with adjacent work the same as, and meets or exceeds the standard of quality, performance and, if applicable, appearance and maintenance considerations, of the specified Product,
 - .2 the proposed substitute manufacturer has capabilities comparable to the specified manufacturer, and
 - .3 the Substitution provides a benefit to Owner.
- .5 If Contractor fails to order a specified Product or order a Product by a specified manufacturer in adequate time to meet Contractor's construction schedule, Consultant will not consider that a valid reason to accept a Substitution.
- .6 If Consultant accepts a Substitution and subject to Owner's agreement, the change in the Work will be documented in the form of either a Supplemental Instruction or Change Order as specified in Section 01 26 00 - Contract Modification Procedures.

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

1.03 SUBMISSION REQUIREMENTS FOR PROPOSED SUBSTITUTIONS

- .1 Include with each proposed Substitution the following information:
 - .1 Identification of the Substitution, including product name and manufacturer's name, address, telephone numbers, and web site.
 - .2 Reason(s) for proposing the Substitution.
 - .3 A statement verifying that the Substitution will not affect the Contract Price and Contract Time or, if applicable, the amount and extent of a proposed increase or decrease in Contract Price and Contract Time on account of the Substitution.
 - .4 A statement verifying that the Substitution will not affect the performance or warranty of other parts of the Work.
 - .5 Manufacturer's Product literature for the Substitution, including material descriptions, compliance with applicable codes and reference standards, performance and test data, compatibility with contiguous materials and systems, and environmental considerations.
 - .6 Product samples as applicable.
 - .7 A summarized comparison of the physical properties and performance characteristics of the specified Product and the Substitution, with any significant variations clearly highlighted.
 - .8 Availability of maintenance services and sources of replacement materials and parts for the Substitution, as applicable, including associated costs and time frames.
 - .9 If applicable, estimated life cycle cost savings resulting from the Substitution.
 - .10 Details of other projects and applications where the Substitution has been used.
 - .11 Identification of any consequential changes in the Work to accommodate the Substitution and any consequential effects on the performance of the Work as a whole. A later claim for an increase to the Contract Price or Contract Time for other changes in the Work attributable to the Substitution will not be considered.

END OF SECTION

1 GENERAL

1.01 SCHEDULE OF LABOUR RATES

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

1.02 SCHEDULE OF EQUIPMENT RATES

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

- .4 Obtain the Owner's written acceptance of the schedule of equipment rates before submitting the first Change Order quotation.
- .5 Accepted schedule of equipment rates will be used solely for evaluating Change Order quotations and cost of performing work attributable to Change Directives.
- .6 The Contractor may request amendments to the accepted schedule of equipment rates if changes in local equipment rental market rates can be demonstrated. Obtain the Owner's written acceptance of such changes.

1.03 METHOD OF CONTRACT PRICE ADJUSTMENT - CHANGE ORDERS

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

1.04 CHANGE ORDER PROCEDURES

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

1.05 FEES FOR OVERHEAD AND PROFIT - CHANGE ORDERS

- .1 Refer to Supplementary Conditions SC.31.

1.06 METHOD OF CONTRACT PRICE ADJUSTMENT - CHANGE DIRECTIVES

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

1.07 CHANGE DIRECTIVE PROCEDURES

- .1 If a Change Directive is issued for a change in the Work for which a proposed change was previously issued, but no Change Order has yet been signed, the Change Directive shall cancel the proposed change and any Contractor quotations related to that change in the Work.
- .2 When proceeding with a change in the Work under a Change Directive, keep accurate records of daily time sheets for labour and Construction Equipment, and invoices for Product and Construction Equipment costs. Submit such records to the Consultant weekly, until the Change Order superseding the Change Directive is issued.

1.08 FEES FOR OVERHEAD AND PROFIT - CHANGE DIRECTIVES

- .1 Refer to Supplementary Conditions SC.32.

1.09 SUPPLEMENTAL INSTRUCTIONS

- .1 The Consultant may issue Supplemental Instructions to provide clarifications to the Contract Documents, provide additional information, or make minor variations in the Work not involving adjustment in the Contract Price or Contract Time.
- .2 If the Contractor considers a Supplemental Instruction to require an adjustment in Contract Price or Contract Time, the Contractor shall promptly notify the Consultant and the Owner in writing and shall not proceed with any work related to the Supplemental Instruction pending receipt of a Change Order, a Change Directive, or, in accordance with the dispute resolution provisions of the General Conditions of Contract, a Notice in Writing of a dispute and instructions to proceed.

END OF SECTION

1 GENERAL

1.01 CONSTRUCTION START-UP MEETING

- .1 Promptly after Contract award, Consultant will establish the time and location of a construction start-up meeting to review and discuss administrative procedures and responsibilities. Consultant will notify Contractor at least 5 Working Days before the meeting.
- .2 Senior representatives of Owner, Consultant, subconsultants, and Contractor, including Contractor's project manager and site superintendent, and major Subcontractors, shall be in attendance.
- .3 Consultant's representative will chair the meeting and record and distribute the minutes.
- .4 Agenda will include following:
 - .1 Appointment of official representatives of Owner, Contractor, Subcontractors, Consultant, and subconsultants.
 - .2 Project communications.
 - .3 Contract Documents for construction purposes.
 - .4 Documents at the site.
 - .5 Contractor's use of premises.
 - .6 Owner-supplied Products.
 - .7 Work restrictions.
 - .8 Cash allowances.
 - .9 Substitution procedures.
 - .10 Contract modification procedures.
 - .11 Payment procedures.
 - .12 Construction progress meetings.
 - .13 Construction progress schedule, including long lead time items.
 - .14 Submittals schedule and procedures.
 - .15 Quality requirements, including testing and inspection procedures.
 - .16 Contractor's mobilization.
 - .17 Temporary utilities.
 - .18 Existing utility services.
 - .19 Construction facilities.
 - .20 Temporary barriers and enclosures.
 - .21 Temporary controls.
 - .22 Field engineering and layout of work.
 - .23 Site safety.
 - .24 Site security.
 - .25 Cleaning and waste management.
 - .26 Closeout procedures and submittals.
 - .27 Other items.

1.02 CONSTRUCTION PROGRESS MEETINGS

- .1 Schedule regular bi weekly construction progress meetings for the duration of the Work. Consultant will prepare meeting agendas, chair the meetings, and record and distribute the minutes.
- .2 Arrange for and provide physical space for meetings.
- .3 Consultant will record in the meeting minutes significant decisions and identify action items and action dates by attendees or the parties they represent.
- .4 Consultant will distribute copies of minutes within three Working Days after each meeting to meeting attendees and any affected parties who may not be in attendance.
- .5 Ensure that Subcontractors attend as and when appropriate to the progress of the Work.
- .6 Agenda for each meeting shall include the following, as a minimum:
 - .1 Approval of minutes of previous meeting.
 - .2 Work progress since previous meeting.
 - .3 Field observations, including any problems, difficulties, or concerns.
 - .4 Construction progress schedule.
 - .5 Submittals schedule.
 - .6 Proposed changes in the Work.
 - .7 Requests for information.
 - .8 Site safety issues.
 - .9 Other business.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 This Section specifies Contractor's responsibilities for preparation and submission of schedules and other documentation related to tracking construction progress.
- .2 The purpose of submitting progress schedules is to:
 - .1 inform Owner and Consultant of actual progress versus planned progress, and
 - .2 Provide assurance that scheduling issues are being proactively identified and addressed in a timely manner, and that planned progress is being maintained as closely as possible.

1.02 CONSTRUCTION PROGRESS SCHEDULE

- .1 Format and Content:
 - .1 Prepare schedule in the form of a Critical Path Method (CPM) Gantt chart using appropriate scheduling software.
 - .2 Provide a work breakdown structure identifying key activities, work packages, and major milestones, including long delivery Products, inspection and testing activities, preparation and review of mock-ups, Owner decisions for cash allowances, shutdown or closure activities, demonstration and training activities, and similar items, at a sufficient level of detail to effectively manage construction progress.
 - .3 Indicate milestone dates for Ready-for-Takeover and Substantial Performance of the Work.
- .2 Submission:
 - .1 Submit initial schedule to Owner and Consultant within 10 Working Days after Contract award.
 - .2 Submit schedule via e-mail as .pdf files.
 - .3 Consultant will review format and content of initial schedule and request necessary changes, if any, within 5 Working Days after receipt.
 - .4 If changes are required, resubmit finalized initial schedule within 5 Working Days after return of review copy.
 - .5 Submit updated progress schedule bi-weekly to Consultant, indicating actual and projected start and finish dates with report date line and progress, activity relationships, critical path, float, and baseline comparison to current progress.

1.03 SUBMITTALS SCHEDULE

- .1 Format and Content:
 - .1 Prepare schedule identifying all required Shop Drawing, Product data, and sample submissions, including samples required for testing.

- .2 Prepare schedule in electronic format.
 - .3 Provide a separate line for each required submittal, organized by Specifications section names and numbers, and further broken down by individual Products and systems as required.
 - .4 For each required submittal, show planned earliest date for initial submittal, earliest date for return of reviewed submittal by Consultant and latest date for return of reviewed submittal without causing delay.
 - .5 Allow time in schedule for resubmission of submittals, should resubmission be necessary.
- .2 Submission:
- .1 Submit initial schedule to Consultant within 15 Working Days after Contract award.
 - .2 Submit schedule via e-mail as .pdf files.
 - .3 Consultant will review format and content of initial schedule and request necessary changes, if any, within 5 Working Days after receipt.
 - .4 If changes are required, resubmit finalized schedule within 5 Working Days after return of review copy.
 - .5 Submit updated submittals schedule monthly to Consultant.

1.04 SCHEDULE MANAGEMENT

- .1 A schedule submitted as specified and accepted by Consultant shall become the baseline schedule and shall be used as the baseline for updates.
- .2 At each regular progress meeting, review and discuss current construction progress and submittals schedules with Consultant, including activities that are behind schedule and planned measures to regain schedule slippage in key areas on or near the critical path.
- .3 Activities considered behind schedule are those with start or completion dates later than the dates shown on the baseline schedule.

1.05 RECORDING ACTUAL SITE CONDITIONS ON AS-BUILT DRAWINGS

- .1 Obtain from Consultant an electronic copy of the construction Drawings for the purpose of creating as-built drawings. Record information in electronic form, clearly identifying as-built deviations from the originally obtained construction Drawings.
- .2 Clearly label each drawing as "AS-BUILT DRAWING". Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .3 Record actual construction including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.

- .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of pipes, ducts, conduits, outlets, fixtures, access panels, and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by Change Orders and Supplemental Instructions.
 - .6 References to Shop Drawings, where Shop Drawings show more detail.
- .4 Do not use as-built drawings for construction purposes.

END OF SECTION

1 GENERAL

1.01 ADMINISTRATIVE

- .1 Submit specified submittals to Consultant for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in the Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time or for Product substitutions or other deviations from the Drawings and Specifications.
- .2 Where required by authorities having jurisdiction, provide submittals to such authorities for review and approval.
- .3 Do not proceed with Work affected by a submittal until review is complete.
- .4 Present Shop Drawings, Product data, and samples in SI metric units. Where items or information is not produced in SI Metric units, converted values are acceptable.
- .5 Review submittals, provide verified field measurements where applicable, and affix Contractor's review stamp prior to submission to Consultant. Contractor's review stamp represents that necessary requirements have been determined and verified, and that the submittal has been checked and coordinated with requirements of the Work and Contract Documents.
- .6 Verify field measurements and that affected adjacent work is coordinated.
- .7 Submittals not meeting specified requirements will be returned with comments.
- .8 Reproduction of construction Drawings to serve as background for Shop Drawings is not permitted.
- .9 Do not propose Substitutions or deviations from Contract Documents via Shop Drawing, Product data and sample submittals.

1.02 SHOP DRAWINGS AND PRODUCT DATA

- .1 Indicate Products, methods of construction, and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of the Work.
- .2 Where Products attach or connect to other Products, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross-references to Drawings, Specifications and other already reviewed Shop Drawings.

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- .3 Accompany submittals with a transmittal information including:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification of each submittal item and quantity.
 - .5 Other pertinent data.
 - .4 Shop Drawing submittals 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, date, and signature of Contractor's authorized representative responsible for Shop Drawing review, indicating that each Shop Drawing has been reviewed for compliance with Contract Documents and, where applicable, that field measurements have been verified.
 - .5 Details of appropriate portions of the Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationships to other parts of the Work.
 - .5 Product data submittals shall include material safety data sheets (MSDS) for all controlled Products.
 - .6 Submit electronic copy of Shop Drawings where specified in the technical Specifications.
 - .7 Submit electronic copy of Product data sheets or brochures where specified in the technical Specifications.
 - .8 Where a submittal includes information not applicable to the Work, clearly identify applicable information and strike out non-applicable information.
 - .9 Supplement standard information to include details applicable to Project.
-

- .10 Allow 5 Working Days for Consultant's review of each submittal and incorporate in submittals schedule specified in Section 01 32 00 - Construction Progress Documentation. Allow additional 5 Working Days where sub-Consultant review is required.
- .11 If upon Consultant's review no errors or omissions are discovered, or if only minor corrections are required as indicated, submittal will be returned and fabrication or installation of Work may proceed.
- .12 If upon Consultant's review significant errors or omissions are discovered, a so noted copy will be returned for correction and resubmission. Do not commence fabrication or installation.
- .13 Consultant's notations on submittals are intended to ensure compliance with Contract Documents and are not intended to constitute a change in the Work requiring change to the Contract Price or Contract Time. If Contractor considers any Consultant's notation to be a change in the Work, promptly notify Consultant in writing before proceeding with the Work.
- .14 Resubmit corrected submittals through same procedure indicated above, before any fabrication or installation of the Work proceeds. When resubmitting, notify Consultant in writing of any revisions other than those requested by Consultant.

1.03 SAMPLES

- .1 Submit samples for Consultant's review in duplicate where specified in the technical Specifications. Label samples as to origin, Project name, and intended use.
- .2 Deliver samples prepaid to Consultant's business address.
- .3 Notify Consultant in writing of any deviations in samples from requirements of Contract Documents.
- .4 Where a required colour, pattern or texture has not been specified, submit full range of available Products meeting other specified requirements.
- .5 Consultant selection from samples is not intended to change the Contract Price or Contract Time. If a selection would affect the Contract Price or Contract Time, notify Consultant in writing prior to proceeding with the Work.
- .6 Resubmit samples as required by Consultant to comply with Contract Documents.
- .7 Reviewed and accepted samples will establish the standard against which installed Work will be reviewed.

END OF SECTION

1 GENERAL

1.01 REFERENCE STANDARDS

- .1 "Reference standards" means consensus standards, trade association standards, guides, and other publications expressly referenced in Contract Documents.
- .2 Where an edition or version date is not specified, referenced standards shall be deemed to be the latest edition or revision issued by the publisher at the time of bid closing. However if a particular edition or revision date of a specified standard is referenced in an applicable code or other regulatory requirement, the regulatory referenced edition or version shall apply.
- .3 Reference standards establish minimum requirements. If Contract Documents call for requirements that differ from a referenced standard, the more stringent requirements shall govern.
- .4 If compliance with two or more reference standards is specified and the standards establish different or conflicting requirements, comply with the most stringent requirement. Refer uncertainties to Consultant for clarification.
- .5 Within the Specifications, reference may be made to the following standards writing, testing, or certification organizations by their acronyms or initialisms:
 - .1 AA - Aluminum Association.
 - .2 ACI - American Concrete Institute.
 - .3 AISC - American Institute of Steel Construction.
 - .4 ANSI - American National Standards Institute.
 - .5 ASME - American Society of Mechanical Engineers.
 - .6 ASTM - American Society for Testing and Materials.
 - .7 AWMAC - Architectural Woodwork Manufacturers Association of Canada.
 - .8 AWPA - American Wire Producers Association.
 - .9 CaGBC - Canadian Green Building Council.
 - .10 CGSB - Canadian General Standards Board.
 - .11 CISC - Canadian Institute of Steel Construction.
 - .12 CPCI - Canadian Prestressed Concrete Institute.
 - .13 CSA - Canadian Standards Association.
 - .14 CSSBI - Canadian Sheet Steel Building Institute.
 - .15 CWB - Canadian Welding Bureau.
 - .16 ICEA - Insulated Cable Engineers Association.
 - .17 IEEE - Institute of Electrical and Electronics Engineers.
 - .18 IGMAC - Insulating Glass Manufacturers Association of Canada.
 - .19 LEED - Leadership in Energy and Environmental Design.
 - .20 MPI - Master Painters Institute.
 - .21 MSS - Manufacturers Standardization Society of the Valve and Fittings Industry.
 - .22 NAAMM - National Association of Architectural Metal Manufacturers.

- .23 NEMA - National Electrical Manufacturers Association.
- .24 NFPA - National Fire Protection Association.
- .25 NHLA - National Hardwood Lumber Association.
- .26 NLGA - National Lumber Grades Authority.
- .27 SSPC - The Society for Protective Coatings.
- .28 TTMAC - Terrazzo, Tile and Marble Association of Canada.
- .29 ULC - Underwriters' Laboratories of Canada.

1.02 INDEPENDENT INSPECTION AND TESTING AGENCIES

- .1 Except as otherwise specified, Owner will retain and pay for independent inspection and testing agencies to inspect, test, or perform other quality control reviews of parts of the Work.
- .2 Retain and pay for inspection and testing that is for Contractor's own quality control or is required by regulatory requirements.
- .3 Section 01 21 00 - Allowances specifies a cash allowance for independent inspection and testing services to be retained and paid for by Contractor. Cash allowance excludes any inspection and testing that is for Contractor's own quality control or is required by regulatory requirements.
- .4 Employment of inspection and testing agencies by Contractor or Owner does not relieve Contractor from responsibility to perform the Work in accordance with Contract Documents.
- .5 Allow and arrange for inspection and testing agencies to have access to the Work, including access to off site manufacturing and fabrication plants.
- .6 For inspection and testing required by Contract Documents or by authorities having jurisdiction, provide Consultant and inspection and testing agencies with timely notification in advance of required inspection and testing.
- .7 Submit test samples required for testing in accordance with submittals schedule specified in Section 01 32 00 - Construction Progress Documentation.
- .8 Provide labour, Construction Equipment and temporary facilities to obtain and handle test samples on site.

1.03 INSPECTION AND TESTING AGENCY REPORTS

- .1 For inspection and testing required by Contract Documents or by regulatory requirements, and performed by Contractor retained inspection and testing agencies, submit to Consultant copies of reports. Submit within 5 days after completion of inspection and testing.

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

1.04 MOCK UPS

- .1 Prepare mock-ups of Work as specified in the technical Specifications. If a mock-up location is not indicated in the Drawings or Specifications, locate where directed by Consultant.
- .2 Modify mock-up as required until Consultant approval is obtained.
- .3 Approved mock-ups establish an acceptable standard for the Work.
- .4 Protect mock-ups from damage until the Work they represent is complete.
- .5 Unless otherwise specified in the technical Specifications, approved mock-ups forming part of the Work may remain as part of the Work.
- .6 Remove mock-ups only when the Work they represent is complete or when otherwise directed by Consultant.

END OF SECTION

1 GENERAL

1.01 TEMPORARY UTILITIES - GENERAL

- .1 Provide temporary utilities as specified and as otherwise necessary to perform the Work expeditiously.
- .2 Remove temporary utilities after use.

1.02 TEMPORARY WATER SUPPLY

- .1 Connect to and use Owner's existing water supply for temporary use during construction, subject to existing available volume and pressure. Usage at no cost to Contractor.

1.03 EXISTING BUILDING HEATING, VENTILATION, POWER, AND LIGHTING

- .1 Existing building heating, ventilation, power, and lighting may be relied upon and used during construction.
- .2 Coordinate and make arrangements with the building operator and pay any costs required for provision of these services.

END OF SECTION

1 GENERAL

1.01 CONSTRUCTION FACILITIES - GENERAL

- .1 Provide temporary construction facilities as necessary for performance of the Work and in compliance with applicable regulatory requirements.
- .2 Maintain temporary construction facilities in good condition for the duration of the Work.
- .3 Remove temporary construction facilities from Place of the Work when no longer required.

1.02 CONSTRUCTION PARKING

- .1 Limited parking will be permitted at Place of the Work provided it does not disrupt continuing operation of the facility.

1.03 VEHICULAR ACCESS

- .1 Provide and maintain adequate access to Place of the Work.
- .2 Existing roads at Place of the Work may be used for access to Place of the Work, provided Contractor assumes responsibility for any damage caused by construction traffic, and prevents or promptly cleans up any mud tracking or material spillage.

1.04 SITE OFFICES

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

1.05 SANITARY FACILITIES

- .1 Provide sanitary facilities for workers.
- .2 Do not use permanent washroom facilities during construction.
- .3 Keep sanitary facilities clean and fully stocked with the necessary supplies in conformance with O. Reg 480/24 and O. Reg 482/24.

1.06 FIRE PROTECTION

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

1.07 PROJECT IDENTIFICATION SIGNS

- .1 Provide Project identification signs. Graphics and text will be provided by Consultant or Owner promptly after Contract award.
- .2 Submit Shop Drawing for Project identification sign graphics and text.
- .3 Erect sign within three weeks of Contract award in location directed or approved by Consultant.
- .4 No other signs or advertisements, other than safety, warning, or directional signs, are permitted without Consultant's prior approval.

END OF SECTION

1 GENERAL

1.01 BARRIERS AND ENCLOSURES - GENERAL

- .1 Provide temporary barriers and enclosures necessary to protect the public and building occupants and to secure Place of the Work during performance of the Work. Refer to Hoarding drawings.
- .2 Comply with applicable regulatory requirements.
- .3 Maintain temporary barriers and enclosures in good condition for the duration of the Work.
- .4 Remove temporary barriers and enclosures from Place of the Work when no longer required.

1.02 EXTERIOR HOARDING

- .1 Erect temporary exterior site hoarding to comply with applicable regulatory requirements and as follows:
 - .1 Use lumber framing and, minimum 13 mm thick exterior grade plywood.
 - .2 Paint public side of hoarding in colour selected by Consultant with one coat primer and one coat exterior paint. Maintain public side of hoarding clean and in good repair until removed.
 - .3 Provide lockable access gates for Construction Equipment and lockable pedestrian doors as required to facilitate construction access.
 - .4 Erect and maintain pedestrian walkways including roof and side covers, complete with pedestrian signage and electrical lighting.

1.03 WEATHER ENCLOSURES

- .1 Provide weather tight enclosures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.
- .2 Provide weather enclosures to protect floor areas where walls are not finished and to enclose work areas that require temporary heating.
- .3 Design weather enclosures to withstand wind pressure and snow loading requirements.

1.04 DUST TIGHT PARTITIONS

- .1 Provide dust tight steel stud and gypsum board partitions to localize interior building areas from dust and noise generating activities.

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

1.05 FIRE ROUTES

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

1.06 PROTECTION OF BUILDING FINISHES

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

END OF SECTION

1 GENERAL

1.01 TEMPORARY CONTROLS - GENERAL

- .1 Provide temporary controls as necessary for performance of the Work and in compliance with applicable regulatory requirements.
- .2 Maintain temporary controls in good condition for the duration of the Work.
- .3 Remove temporary controls and Construction Equipment used to provide temporary controls from Place of the Work when no longer required.

1.02 PLANT PROTECTION

- .1 Protect trees and other plant material designated to remain on site and on adjacent properties where indicated on Drawings.
- .2 Protect trees and shrubs susceptible to damage during construction by encasing with protective wood framework from grade to height of two metres.
- .3 For trees designated to remain, protect roots inside dripline from disturbance or damage during excavation and grading. Avoid traffic, dumping and storage of materials over root zones.
- .4 Minimize stripping of topsoil and vegetation.

1.03 DUST AND PARTICULATE CONTROL

- .1 Implement and maintain dust and particulate control measures in accordance with applicable regulatory requirements.
- .2 Execute Work by methods that minimize dust from construction operations and spreading of dust on site or to adjacent properties.
- .3 Provide temporary enclosures to prevent extraneous materials resulting from sandblasting or similar operations from contaminating air beyond immediate work area.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- .5 Use appropriate covers on trucks hauling fine, dusty, or loose materials.

1.04 DEWATERING

- .1 Provide temporary drainage and pumping as necessary to dewater excavations, trenches, foundations, and other parts of the Work. Maintain such areas free of water arising from groundwater or surface run-off, as required to keep them stable, dry, and protected from damage due to flooding.
- .2 Maintain standby equipment necessary to ensure continuous operation of dewatering system.
- .3 Do not pump water containing suspended materials or other harmful substances into waterways, sewers or surface drainage systems. Treat or dispose of such water in accordance with applicable regulatory requirements.

1.05 SITE DRAINAGE

- .1 Maintain grades to ensure proper site drainage.
- .2 Prevent surface water runoff from leaving the site except as otherwise provided by stormwater management plan.
- .3 Prevent precipitation from infiltrating or from directly running off stockpiled waste materials. Cover stockpiled waste materials with an impermeable liner during periods of work stoppage including at end of each Working Day.
- .4 Control surface drainage from cuts and fills, from borrow and waste disposal areas, from stockpiles, staging areas, and other work areas as required to prevent erosion and sedimentation.
- .5 Control surface drainage by ensuring that gutters are kept open and water is not directed across or over pavements or sidewalks, except through pipes or properly constructed troughs. Ensure that runoff from unfinished areas is intercepted and diverted to suitable outlets.

1.06 EROSION AND SEDIMENT CONTROL

- .1 Minimize amount of bare soil exposed at one time. Stabilize disturbed soils as quickly as practical to minimize erosion. Remove accumulated sediment resulting from construction activity from adjoining surfaces, drainage systems, and watercourses, and repair damage caused by soil erosion and sedimentation.
- .2 Provide and maintain appropriate temporary measures such as silt fences, straw bales, ditches, geotextiles, drains, berms, terracing, riprap, temporary drainage piping, sedimentation basins, vegetative cover, dikes, and other measures that may be required to prevent erosion and migration of silt, mud, sediment, and other debris.

- .3 Do not disturb existing embankments or embankment protection.
- .4 Periodically inspect erosion and sediment control measures to detect evidence of erosion and sedimentation. Promptly take corrective measures when necessary.
- .5 If soil and debris from site accumulate in ditches or other low areas, remove accumulation and restore area to original condition.

1.07 POLLUTION CONTROL

- .1 Take measures to prevent contamination of soil, water, and atmosphere through uncontrolled discharge of noxious or toxic substances and other pollutants, potentially causing environmental damage.
- .2 Be prepared, by maintaining appropriate materials, equipment, and trained personnel on site, to intercept, clean up, and dispose of spills or releases that may occur. Promptly report spills and releases that may occur to:
 - .1 authority having jurisdiction,
 - .2 person causing or having control of pollution source, if known, and
 - .3 Owner and Consultant.
- .3 Contact manufacturer of pollutant, if known and applicable, to obtain material safety data sheets (MSDS) and ascertain hazards involved and precautions and measures required in cleanup or mitigating actions.
- .4 Take immediate action to contain and mitigate harmful effects of the spill or release.

END OF SECTION

1 GENERAL

1.01 GENERAL PRODUCT REQUIREMENTS

- .1 Provide Products that are not damaged or defective, and suitable for purpose intended, subject to specified requirements. If requested by Consultant, furnish evidence as to type, source and quality of Products provided.
- .2 Unless otherwise specified, maintain uniformity of manufacture for like items throughout.
- .3 Permanent manufacturer's markings, labels, trademarks, and nameplates on Products are not acceptable in prominent locations, except where required by regulatory requirements or for operating instructions, or when located in mechanical or electrical rooms.

1.02 PRODUCT OPTIONS

- .1 Subject to the provisions of Section 01 25 00 -Substitution Procedures:
 - .1 Wherever a Product or manufacturer is specified by a single proprietary name, provide the named Product only.
 - .2 Wherever more than one Product or manufacturer is specified by proprietary name for a single application, provide any one of the named Products.
- .2 Wherever a Product is specified by reference to a standard only, provide any Product that meets or exceeds the specified standard. If requested by Consultant, submit information verifying that the proposed Product meets or exceeds the specified standard.
- .3 Wherever a Product is specified by descriptive or performance requirements only, provide any Product that meets or exceeds the specified requirements. If requested by Consultant, submit information verifying that the proposed Product meets or exceeds the specified requirements.

1.03 PRODUCT AVAILABILITY AND DELIVERY TIMES

- .1 Promptly upon Contract award and periodically during construction, review and confirm Product availability and delivery times. Order Products in sufficient time to meet the construction progress schedule and the Contract Time.
- .2 If a specified Product is no longer available, promptly notify Consultant. Consultant will take action as required.

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

1.04 STORAGE, HANDLING, AND PROTECTION

- .1 Store, handle, and protect Products during transportation to Place of the Work and before, during, and after installation in a manner to prevent damage, adulteration, deterioration and soiling.
- .2 Comply with manufacturer's instructions for storage, handling and protection.
- .3 Store packaged or bundled Products in original and undamaged condition with manufacturer's seals and labels intact. Do not remove from packaging or bundling until required in Work.
- .4 Comply with the requirements of the workplace hazardous materials information system (WHMIS) regarding use, handling, storage, and disposal of hazardous materials, including requirements for labeling and the provision of material safety data sheets (MSDS).
- .5 Store Products subject to damage from weather in weatherproof enclosures.
- .6 Store sheet Products on flat, solid, supports and keep clear of ground. Slope to shed moisture.
- .7 Remove and replace damaged Products.

END OF SECTION

1 GENERAL

1.01 SURVEYOR QUALIFICATIONS

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

1.02 SUBMITTALS

- .1 Submit name and address of registered land surveyor performing survey work.
- .2 Submit to Consultant the survey of the Work prepared and issued by a registered land surveyor as required by authorities having jurisdiction and on completion of the Work.

1.03 SURVEY REFERENCE POINTS

- .1 Locate and confirm permanent reference points prior to starting site work. Preserve and protect permanent reference points on site during construction.
- .2 Do not change or relocate reference points without prior written notice to Consultant.
- .3 Report to Consultant when a reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations. Require registered land surveyor to replace reference points in accordance with original survey.

1.04 SURVEY REQUIREMENTS

- .1 Establish sufficient permanent benchmarks on site, referenced to established benchmarks by survey control points.
- .2 Confirm that existing survey reference points are in accordance with Owner's survey and property limits.
- .3 Establish initial lines and levels for building layout.
- .4 Maintain a complete, accurate log of control and survey work as it progresses. Record locations with horizontal and vertical data in project record documents.

1.05 EXISTING UTILITIES AND STRUCTURES

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

- .2 Promptly notify Consultant if underground utilities, structures, or their locations differ from those indicated in Contract Documents or in available project information. Consultant will provide appropriate direction.
- .3 Record locations of maintained, re-routed and abandoned utility lines.

1.06 VERIFICATION OF EXISTING CONDITIONS

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

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Except where otherwise specified in technical Specifications or otherwise indicated on Drawings, comply with requirements of this Section.

1.02 MANUFACTURER'S INSTRUCTIONS

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

1.03 CONCEALMENT

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

1.04 FASTENINGS - GENERAL

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials.
- .2 Prevent electrolytic action and corrosion between dissimilar metals and materials by using suitable non-metallic strips, washers, sleeves, or other permanent separators to avoid direct contact.
- .3 Use non-corrosive fasteners and anchors for securing exterior work and in spaces where high humidity levels are anticipated.

- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Do not use fastenings or fastening methods that may cause spalling or cracking of material to which anchorage is made.

1.05 FASTENINGS - EQUIPMENT

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

1.06 FIRE RATED ASSEMBLIES

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

1.07 LOCATION OF FIXTURES, OUTLETS AND DEVICES

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

1.08 PROTECTION OF COMPLETED WORK AND WORK IN PROGRESS

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

1.09 REMEDIAL WORK

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

END OF SECTION

1 GENERAL

1.01 REQUEST FOR CUTTING, PATCHING AND REMEDIAL WORK

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

1.02 PRODUCTS

- .1 Unless otherwise specified, when replacing existing or previously installed Products in the course of cutting and patching work, use replacement Products of the same character and quality as those being replaced.
- .2 If an existing or previously installed Product must be replaced with a different Product, submit request for substitution in accordance with Section 01 25 00 - Substitution Procedures.

1.03 PREPARATION

- .1 Inspect existing conditions in accordance with Section 01 71 00 - Examination and Preparation.
- .2 Provide supports to ensure structural integrity of surroundings; provide devices and methods to protect other portions of the Work from damage.
- .3 Provide protection from elements for areas that may be exposed by uncovering work.

1.04 EXISTING UTILITIES

- .1 When breaking into or connecting to existing services' utilities, execute the Work at times directed by local governing authorities, with a minimum of disturbance to the Work, pedestrian and vehicular traffic, and ongoing Owner operations.
- .2 Maintain excavations free of water.
- .3 Keep duration of interruptions to a minimum.
- .4 Carry out interruptions after regular working hours of occupants, preferably on weekends, unless Owner's prior written approval is obtained.
- .5 Protect and maintain existing active services. Record location of services, including depth, on as-built drawings.
- .6 Construct or erect barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures as required to protect pedestrian and vehicular traffic.

1.05 CUTTING, PATCHING, AND REMEDIAL WORK

- .1 Coordinate and perform the Work to ensure that cutting and patching work is kept to a minimum.
- .2 Perform cutting, fitting, patching, and remedial work [including excavation and fill,] to make the affected parts of the Work come together properly and complete the Work.
- .3 Provide openings in non structural elements of the Work for penetrations of mechanical and electrical work.
- .4 Perform cutting by methods to avoid damage to other work
- .5 Provide proper surfaces to receive patching, remedial work, and finishing.
- .6 Perform cutting, patching, and remedial work using competent and qualified specialists familiar with the Products affected, in a manner that neither damages nor endangers the Work.
- .7 Do not use pneumatic or impact tools without Consultant's prior approval.
- .8 Ensure that cutting, patching, and remedial work does not jeopardize manufacturers' warranties.
- .9 Refinish surfaces to match adjacent finishes. For continuous surfaces refinish to nearest intersection. For an assembly, refinish entire unit.

- .10 Fit work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces with suitable allowance for deflection, expansion, contraction, acoustic isolation, and firestopping.
- .11 Maintain fire ratings of fire rated assemblies where cutting, patching, or remedial work is performed. Completely seal voids or penetrations of assembly with firestopping material to full depth or with suitably rated devices.

END OF SECTION

1 GENERAL

1.01 REGULATORY REQUIREMENTS

- .1 Comply with applicable regulatory requirements when disposing of waste materials.
- .2 Obtain permits from authorities having jurisdiction and pay disposal fees where required for disposal of waste materials and recyclables.

1.02 GENERAL CLEANING REQUIREMENTS

- .1 Provide adequate ventilation during use of volatile or noxious substances. Do not rely on building ventilation systems for this purpose.
- .2 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .3 Prevent cross-contamination during the cleaning process.
- .4 Notify the Consultant of the need for cleaning caused by Owner or other contractors.

1.03 PROGRESSIVE CLEANING AND WASTE MANAGEMENT

- .1 Maintain the Work in a tidy and safe condition, free from accumulation of waste materials and construction debris.
- .2 Provide appropriate, clearly marked, containers for collection of waste materials and recyclables. Locate containers where indicated on Drawings.
- .3 Remove waste materials and recyclables from work areas, separate, and deposit in designated containers at end of each Working Day. Collect packaging materials for recycling or reuse.
- .4 Remove waste materials and recyclables from Place of the Work at regular intervals.
- .5 Clean interior building areas prior to start of finish work and maintain free of dust and other contaminants during finishing operations.
- .6 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly finished surfaces nor contaminate building systems.
- .7 Clear snow and ice from public sidewalks as required to comply with applicable municipal regulatory requirements.

1.04 FINAL CLEANING

- .1 Before final cleaning, arrange a meeting at Place of the Work to determine the acceptable standard of cleaning. Ensure that Owner, Consultant, Contractor and cleaning company are in attendance.
- .2 Remove from Place of the Work surplus Products, waste materials, recyclables, Temporary Work, and Construction Equipment not required to perform any remaining work.
- .3 Provide professional cleaning by a qualified, established cleaning company.
- .4 Lock or otherwise restrict access to each room or area after completing final cleaning in that area.
- .5 Re-clean as necessary areas that have been accessed by Contractor's workers prior to Owner occupancy.
- .6 Remove stains, spots, marks, and dirt from finished surfaces, electrical and mechanical fixtures, furniture fitments, walls, and floors.
- .7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and all other finished surfaces, including mechanical and electrical fixtures. Replace broken, scratched or otherwise damaged glass.
- .8 Remove dust from lighting reflectors, lenses, lamps, bulbs, and other lighting surfaces.
- .9 Vacuum clean and dust exposed wall, floor, and ceiling surfaces, behind grilles, louvres and screens, and above suspended ceiling tiles.
- .10 Clean mechanical, electrical, and other equipment. Replace filters for mechanical equipment if equipment is used during construction.
- .11 Remove waste material and debris from crawlspaces and other accessible concealed spaces.
- .12 Remove stains, spots, marks, and dirt from exterior facades.
- .13 Clean exterior and interior window glass and frames.
- .14 Sweep clean, power wash, and remove snow and ice from exterior sidewalks, steps, parking lots, and other paved surfaces.
- .15 Use leaf blowers to clean landscaped surfaces.

1.05 WASTE MANAGEMENT AND DISPOSAL

- .1 Dispose of waste materials and recyclables at appropriate municipal landfills and recycling facilities in accordance with applicable regulatory requirements.
- .2 Do not burn or bury waste materials at Place of the Work.
- .3 Do not dispose of volatile and other liquid waste such as mineral spirits, oil, paints and other coating materials, paint thinners, cleaners, and similar materials together with dry waste materials or on the ground, in waterways, or in storm or sanitary sewers. Collect such waste materials in appropriate covered containers, promptly remove from Place of the Work, and dispose of at recycling facilities or as otherwise permitted by applicable regulatory requirements.
- .4 Cover or wet down dry waste materials to prevent blowing dust and debris.

END OF SECTION

1 GENERAL

1.01 READY-FOR-TAKEOVER

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

1.02 INSPECTION AND REVIEW BEFORE READY-FOR-TAKEOVER

- .1 Contractor's Inspection: Before applying for the Consultant's review to establish Ready-for-Takeover of the Work:
 - .1 Ensure that the specified prerequisites to Ready-for-Takeover of the Work are completed.
 - .2 Conduct an inspection of the Work to identify defective, deficient, or incomplete work.
 - .3 Prepare a comprehensive and detailed list of items to be completed or corrected.
 - .4 Provide an anticipated schedule and costs for items to be completed or corrected.
- .2 Consultant's Review: Upon receipt of the Contractor's application for review, together with the Contractor's list of items to be completed or corrected, the Consultant and the Contractor shall arrange a mutually satisfactory agreed date and time to jointly review the Work. The Consultant will advise the Contractor whether or not the Work is Ready-for-Takeover. Add additional items, if any, to the Contractor's list of items to be completed or corrected. Provide the Consultant with a copy of the revised list.
- .3 Maintain the list of items to be completed or corrected and promptly correct or complete defective, deficient and incomplete work. The Contractor's inspection and Consultant's review procedures specified above shall be repeated until the Work is Ready-for-Takeover and no items remain on the Contractor's list of items to be completed or corrected.
- .4 When the Consultant determines that the Work is Ready-for-Takeover, the Consultant will notify the Contractor and the Owner in writing to that effect.

1.03 PREREQUISITES TO FINAL PAYMENT

- .1 After Ready-for-Takeover of the Work and before submitting an application for final payment in accordance with the General Conditions of Contract:
 - .1 Correct or complete all remaining defective, deficient, and incomplete work.
 - .2 Remove from the Place of the Work all remaining surplus Products, Construction Equipment, and Temporary Work.

- .3 Perform final cleaning and waste removal necessitated by the Contractor's work performed after Ready-for-Takeover, as specified in Section 01 74 00 - Cleaning and Waste Management.

1.04 PARTIAL USER OCCUPANCY

- .1 If partial Owner occupancy of a part of the Work is required before the date of Ready-for-Takeover of the entire Work of the Contract, the provisions of this Section shall apply, to the extent applicable, to that part of the Work that the Owner intends to occupy.

1.05 SUBSTANTIAL PERFORMANCE OF THE WORK

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

END OF SECTION

1 GENERAL

1.01 OPERATION AND MAINTENANCE MANUAL

- .1 Prepare a comprehensive operation and maintenance manual, in the language of the Contract, using personnel qualified and experienced for this task.
- .2 Submit an initial draft of the operation and maintenance manual for Consultant's review. If required by Consultant's review comments, revise manual contents and resubmit for Consultant's review. If required, repeat this process until Consultant accepts the draft manual in writing.
- .3 Submit final version to Owner in one hard copy and one electronic format on acceptable storage media.

1.02 OPERATION AND MAINTENANCE MANUAL FORMAT

- .1 Organize data in the form of an instructional manual.
- .2 Binders: vinyl, hard covered, three D-rings, loose leaf, 216 x 279 mm, with spine and face pockets.
- .3 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.
- .4 Cover: Identify each binder with typed or printed title "Operation and Maintenance Manual", name of Project or facility, and subject matter of contents.
- .5 Arrange content by systems, under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate Product or system, with typed description of Product and major component parts of equipment.
- .7 Text: Manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- .9 Provide electronic copy of manual in PDF format.
- .10 Provide electronic copy of Shop Drawings in manual as 1:1 scaled CAD files in .dwg format on electronic media acceptable to Owner.

1.03 OPERATION AND MAINTENANCE MANUAL - GENERAL CONTENT

- .1 Table of contents for each volume.
- .2 Introductory information including:
 - .1 Date of manual submission.
 - .2 Complete contact information for Consultant, subconsultants, other consultants, and Contractor, with names of responsible parties.
 - .3 Schedule of Products and systems indexed to content of volume.
- .3 For each Product or system, include complete contact information for Subcontractors, Suppliers and manufacturers, including local sources for supplies and replacement parts.
- .4 Product Data: mark each sheet to clearly identify specific products, options, and component parts, and data applicable to installation. Delete or strike out inapplicable information. Supplement with additional information as required.
- .5 Reviewed Shop Drawings.
- .6 Permits, certificates, letters of assurance and other relevant documents issued by or required by authorities having jurisdiction.
- .7 Warranties.
- .8 Operating and maintenance procedures, incorporating manufacturer's operating and maintenance instructions, in a logical sequence.
- .9 Training materials as specified by Commissioning Consultant.

1.04 OPERATION AND MAINTENANCE MANUAL - EQUIPMENT AND SYSTEMS CONTENT

- .1 Each Item of Equipment and Each System: include description of unit or system and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel Board Circuit Directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start up, break in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut down, and emergency instructions. Include summer, winter, and any special operating instructions.

- .5 Maintenance Requirements: include routine procedures and guide for trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's coordination 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 testing and balancing reports.
- .15 Include additional content as specified in technical Specifications sections.

1.05 OPERATION AND MAINTENANCE MANUAL - PRODUCTS AND FINISHES CONTENT

- .1 Include Product data, with catalogue number, options selected, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured Products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Include an outline of requirements for routine and special inspections and for regular maintenance to ensure that on-going performance of the building envelope will meet the initial building envelope criteria.
- .4 Include additional content as specified in technical Specifications sections.

1.06 OPERATION AND MAINTENANCE MANUAL - WARRANTIES CONTENT

- .1 Separate each warranty with index tab sheets keyed to Table of Contents listing.
- .2 List each warrantor with complete contact information.
- .3 Verify that documents are in proper form and contain full information. Ensure that warranties are for the correct duration and are in Owner's name.

1.07 CONTRACTOR'S AS-BUILT DRAWINGS

- .1 Submit final as-built drawings in the form specified in Section 01 32 00 - Construction Progress Documentation to Consultant.

1.08 SPARE PARTS, MAINTENANCE MATERIALS, AND SPECIAL TOOLS

- .1 Supply spare parts, maintenance materials, and special tools in quantities specified in technical Specifications sections.
- .2 Ensure spare parts and maintenance materials are new, not damaged nor defective, and of same quality, manufacturer, and batch or production run as installed Products.
- .3 Provide tags for special tools identifying their function and associated Product.
- .4 Deliver to and store items at location directed by Owner at Place of the Work. Store in original packaging with manufacturer's labels intact and in a manner to prevent damage or deterioration.
- .5 Catalogue all items and submit to Consultant an inventory listing organized by Specifications section. Include Consultant reviewed inventory listing in operation and maintenance manual.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Work of this Section is to establish quality management procedures associated with performance of concrete slab placing and finishing that will require contributions from multiple divisions of the Work.
- .2 Work of this Section includes requirements for developing content relating to construction of concrete floor slabs (concrete flatwork) to achieve specified concrete finishing tolerances for concrete substrates associated with the following:
 - .1 Concrete Mix Design: Prepare concrete mix design that accounts for appropriate workability (slump and flow) based on performance requirements for the Project, and that accounts for concrete trades' requirements to achieve specified concrete tolerances including adjustment for slump and consolidation on site and applied floorcovering manufacturers' requirements.
 - .2 Concrete Formwork: Prepare formwork erection drawings for suspended slabs in accordance with CSA A23.1, and verify that perimeter (FL) of horizontal concrete slabs and blocked-out openings through slabs are at the same level and verify that construction schedule accounts for specified strength gain before removal and relocation.
 - .3 Concrete Reinforcement: Schedule installation of concrete reinforcement to allow sufficient time for Consultant's review and acceptance before scheduling delivery of concrete to project site.
 - .4 Concrete Delivery: Control delivery of concrete to maintain concrete mix design properties accepted by the Consultant at time of discharge, without use of unscheduled additives and water by the transit mix operator and onsite personnel.
 - .5 Concrete Finishing: Coordinate with Division 03 for specified FF:FL tolerances and locations of different FF:FL outcomes (the footprint), that account for admixtures required to attain optimal concrete workability for placers and finishers, and that are compatible with adhesives used for applied finishes and floorcoverings.
 - .6 Concrete Protection: Describe methods to protect newly placed and finished concrete from rain and snow, freezing conditions, wind, heat and differential shading until concrete is cured sufficiently to prevent damage to surface finish, and confirm methods to limit loads on new concrete slabs until sufficient strength is attained to support construction loads.
 - .7 Concrete Curing: Describe methods for managing application and removal of Products used to aid the concrete curing process, with the goal to minimize the use of surface applied curing compounds, sealer/hardeners and moisture retarders that may be detrimental to finished surface.
 - .8 Concrete Surface Preparation: Describe methods for managing removal of incompatible curing compounds and providing concrete surface profiles acceptable for bonding of floorcovering adhesives.

- .9 Concrete Toppings and Underlayments: Describe concrete toppings and underlayments proposed for use, and methods achieving specified tolerances.

1.02 REFERENCE STANDARDS

- .1 ACI 117.1R - Guide for Tolerance Compatibility in Concrete Construction.
- .2 ASTM E1155 - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers.
- .3 ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- .4 CSA A23.1/A23.2 - Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
- .5 National Floor Covering Association of Canada (NFCA) - Floor Covering Reference Manual.

1.03 ADMINISTRATIVE REQUIREMENTS

- .1 Consultant's Specified Requirements: Consultant researched and incorporated appropriate measurement tolerances for materials, components, accessories and assemblies affecting performance outcomes associated with interior floor finishing during the design and documentation phases of the Project; and included descriptions within the Drawings and Specifications issued by the Consultant where appropriate.
- .2 Quality Management Program (QMP): Submit QMP indicating standardized approach to managing quality of materials and workmanship during execution of the work associated with achieving concrete finishing tolerances identified in the Specifications including the following:
 - .1 Preconstruction Quality Planning: Develop preconstruction activities forming a part of the QMP in accordance with CSA A23.1, and requirements of this Section.
 - .2 Quality Assurance: Activities, actions, corrective remedies and procedures performed before and during execution of the Work to protect against defects and deficiencies, and confirming that construction is consistent with specified performance requirements listed within the Specification.
 - .3 Quality Control: Observations, procedures, and related actions performed during and after execution of the Work to verify that completed construction complies with specified performance requirements, standards and technical requirements listed within the Specifications.

- .4 Limitations: Quality management activities performed by the Contractor do not include contract administration and reporting performed by the Consultant.
- .3 Trade Contribution: Trades will coordinate requirements described in this section with the Contractor to identify installation conditions affecting concrete placing and finishing, and that affect compatibility of specified floor finishes discussed during the pre-construction meetings described below, Contractor will incorporate comments as a part of the QMP.
- .4 Pre-Construction Tolerance Coordination Meetings: Conduct pre-construction tolerance coordination meetings in accordance with Section 01 31 19, attended by Owner, Consultant, Contractor and Trades whose work is affected by work of this Section to discuss the following before starting any concrete related construction:
 - .1 Calculated changes to floor flatness profiles arising from natural changes to concrete such as shrinkage, curling, creep or plastic deformation that will occur between performing measurements for Concrete Quantitative Tolerances and measurements for Floorcovering Qualitative Tolerances;
 - .2 Methods for aligning measurement tolerances for individual trade contributions to the work, to those required by other parts of the work;
 - .3 Confirming concrete density, absorption and surface profile required for installation of applied finishes and floorcoverings;
 - .4 Identify any conflicts between adjacent components of the work that have potential to affect achieving the measurement tolerances required for individual contributions to the work;
 - .5 Resolve issues and implement management controls associated with meeting specified tolerances;
 - .6 Management of unit price allowances described by this Section associated with meeting specified tolerances;
 - .7 Management of temporary heating to maintain optimal concrete curing, and management of temperature and humidity required for installation of applied finishes and floorcoverings; and
 - .8 Other topics affecting the work described in this Section.
- .5 Pre-Construction Meetings: Conduct pre-construction meetings starting approximately 1 month before starting concrete work, and throughout the construction phase as necessary to achieve specified performance requirements in accordance with Section 01 31 19, attended by Owner, Consultant, Contractor and Trades whose work is affected by work of this Section to discuss the following:
 - .1 Best Practices Meetings: Confirm best practices relating to workmanship required to achieve specified floor finishing performance including the following:
 - .1 Sequence of work and confirmation of compatibility of installed materials and substrates;
 - .2 Using forming methods that limit potential deviation from specified performance requirements;

- .3 Using placing and finishing methods that limit potential deviation from specified performance requirements;
 - .4 Responsibility for completion of substrate preparation and ambient weather measurements performed by Contractor before start of floor finish Trades work described in this Section;
 - .5 Responsibility for measurements and testing performed by floor finish Trades work described in this Section;
 - .6 Installation follow-up procedures to reduce or eliminate substrate and installation deficiencies;
 - .7 Using experienced, trained or certified floor finish Trades for components critical to achieving specified performance requirements;
 - .8 Other procedures identified during best practices meetings that affect work results described in this Section.
- .2 Flatness/Levelness Surveying: Confirm access and survey frequency for collection of finishing tolerances for concrete substrates specified in Division 03;
- .3 Construction Joint Curvature Tolerance: Confirm that reinforcing methods for forming construction joints in concrete slabs described in Division 03 are consistent with maintaining specified surface curvatures;
- .4 Concrete Quantitative Tolerance (FF:FL): Confirm that Concrete Quantitative Tolerance meets requirements specified in Division 03 prepared at time of concrete placement;
- .5 Floorcovering Qualitative Tolerance (Straightedge): Confirm that Floorcovering Qualitative Tolerance meets requirements for finished floor coverings/coatings, accounting for natural changes to flatness profile arising from shrinkage, curling or plastic deflection of concrete slabs, and installation of self-levelling compounds and surface preparation products;
- .6 Condition of Substrates: Confirm that concrete substrate conditions are acceptable to finished floor coverings/coatings manufacturer requirements for relative humidity, mechanical bond and porosity, smoothness and other conditions affecting quality of floorcovering and finishes installation;
- .7 Measurement and Testing Frequency: Determine frequency and timing of site testing and observation reporting of floorcoverings substrates to confirm acceptability for manufacturers installation requirements; and
- .8 Other topics affecting work described in this Section.
- .6 Coordination: Coordinate qualification requirements and contributions from Division 03 and requirements from Division 09 associated with interior concrete floor finishing performance as follows:
- .1 Coordinate concrete mix design and confirm workability of mix to achieve finishing tolerances for concrete substrates specified in Division 03, and confirm compatibility with bonding performance required by products specified herein.

- .2 Coordinate with concrete floor finishing Trades and confirm they employ sufficient numbers of qualified and experienced personnel during concrete placement operations to achieve finishing tolerances for concrete substrates.
- .3 Coordinate concrete curing methods proposed for use on the Project and confirm that curing methods and materials, and substrate remediation methods are compatible with installation of floorcoverings and other applied finishes.
- .4 Coordinate requirements for measurements, testing and preparation of concrete substrates.
- .5 Coordinate with Trades responsible for cementitious topping and underlayments and confirm products proposed for use.
- .6 Coordinate Trades contributing to floor finishing mock-up described in this Section.
- .7 Scheduling: Schedule concrete placing and finishing to account for floor finishing performance requirements described in this Section and as follows:
 - .1 Schedule delivery of concrete to prevent use of unscheduled water and additives being added to the mix during transport or as a consequence of delays at time of discharge without prior approval from Consultant.
 - .2 Schedule concrete formwork removal in accordance with Division 03, early removal of formwork will not be permitted unless specifically directed by the Consultant.
 - .3 Schedule concrete placing and finishing operations to minimize exposure to adverse weather conditions in accordance with CSA A23.1.
 - .4 Schedule measurements and testing performed by Trades responsible for work results specified.

1.04 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Information Submittals: Provide the following submittals during the course of work of this Section:
 - .1 Concrete Placing and Finishing Records: Submit written records for each concrete placement including the following:
 - .1 Volume, location and date of concrete placement relating to gridlines indicated on Drawings;
 - .2 Weather conditions on date of concrete placement;
 - .3 Building enclosure conditions on date of concrete placement;
 - .4 Temperature of granular base for slabs-on-grade, or ambient temperature of formwork substrate; and
 - .5 Any unusual observations or conditions affecting concrete placement.

- .2 Substrate Condition and Compatibility Report: Submit confirmation that substrate conditions and applied curing agents, toppings and underlayments are acceptable for specified applied finishes and floorcoverings.
- .3 Survey Data: Submit floor flatness/floor levelness reports at intervals specified in this Section.

1.05 QUALIFICATIONS

- .1 Concrete Finisher Qualifications: Engage Trades that can coordinate supply and installation of concrete formwork and reinforcing steel, concrete placing and finishing, curing and jointing in a coordinated-source arrangement, and as specified in Division 03.
- .2 Floorcovering Installer Qualifications: Engage floorcovering Trades that maintain membership in the National Floor Covering Association of Canada.

1.06 MOCK-UP

- .1 Provide required Mock-Ups in accordance with Section 01 40 00.
- .2 Coordinated Floor Finishing Mock-Up: Comprised of materials and methods used for concrete placement, finishing and curing, and that describes subsequent work results critical to performance of floorcoverings and other applied finishes for confirmation of the following:
 - .1 Concrete mix design that is compatible with bonding requirements for adhesives used by floorcoverings and other applied finishes;
 - .2 Methods for achieving specified concrete finishing tolerances;
 - .3 Concrete curing methods proposed for use and demonstrate compatibility with bonding requirements for floorcoverings and other applied finishes;
 - .4 Demonstrate materials and methods proposed for use with concrete slab patching and repairs;
 - .5 Demonstrate sealant and backing materials proposed for saw-cut joint filling;
 - .6 Demonstrate crack injection products proposed for use;
 - .7 Application of toppings and underlayments to confirm bonding to concrete slab;
 - .8 Application of architectural concrete finishes;
 - .9 Application of floorcoverings and other applied finishes to confirm bonding between concrete slab, toppings and underlayments.
- .3 Location of Mock-Up: Construct site mock-up in location and size indicated on Drawings using materials required for the completed work.

- .4 Review of Mock-Up: Mock-up will be reviewed by Consultant, floorcovering and other applied finish Trades to confirm acceptability of substrate conditions as follows:
 - .1 Notify Consultant 7 days in advance of dates and times when mock-ups will be constructed.
 - .2 Obtain Consultant's acceptance of mock-ups before starting construction; Consultant may request modifications or corrections to the mock-up to determine acceptance.
 - .3 Maintain mock-up for duration of floor finishing work; mock-up will be used throughout construction period and used as standard of acceptance for subsequent concrete finishing work.
 - .4 Remove mock-up at completion of concrete finishing work, and restore surfaces to acceptable surface profile and finish matching adjacent surfaces in the area of the mock-up.

2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- .1 Refer to floor finishing Specification Sections.

3 EXECUTION

3.01 EXAMINATION

- .1 Concrete Testing: Refer to Division 03 for testing associated with concrete quality.
- .2 Substrate Testing: Refer to Division 09 floor finish Sections for testing associated with moisture emissions, surface porosity and alkalinity, and adhesive compatibility of concrete substrates before installation of floorcovering materials.
- .3 Concrete Finishing Tolerances Survey: Survey concrete slabs based on concrete finishing tolerance standards applicable to the work described in individual specification Sections:
 - .1 Concrete Quantitative Tolerance (FF:FL) Measurements: Measure concrete substrate and confirm they meet project requirements specified in Division 03.
 - .2 Floorcovering Qualitative Tolerance (Straightedge) Measurements: Measure concrete substrate and confirm they meet project requirements specified in Division 09.

3.02 PROTECTION

- .1 Temperature and Humidity Controls during Construction: Install indirect temporary heating sources for building interior spaces in accordance with Section 01 51 00 capable of maintaining consistent and controllable temperature, and maintaining temperature of substrates at a minimum of 3°C above air dew point.
- .2 Protection of Concrete Substrates: Protect concrete substrate surfaces during construction to minimize surface contamination and provide a surface that is compatible with floorcovering and applied finishes manufacturers installation tolerances, and correct differential between Concrete Quantitative Tolerance (FF:FL) and Floorcovering Qualitative Tolerance (Straightedge) in accordance with Division 09, free from alkali, dust and dirt, adhesives, paints and coatings, solvents and oils, grease, wax, form release agents, film forming sealers and curing aids, and film forming hardening compounds that are incompatible with flooring adhesives.

3.03 ALIGNING DIFFERENTIAL TOLERANCES

- .1 Consultant's Contributions: Consultant is responsible for identifying tolerances used for construction, and aligning compatibility of differing tolerances between components of the Work in accordance with ACI 117.1R and has been completed as follows:
 - .1 Consultant has accounted for compatibility between differing tolerances in the Drawings and Specifications, and developed content that identifies measurement standards used for concrete floor finishing, and measurements used for floorcovering and other applied finishes.
 - .2 Consultant will review survey data and collaborate with Owner, Contractor and Trades affected by work of this Section to determine acceptability of floor elevation profiles.
 - .3 Consultant will provide written direction to Contractor for interpretations arising from measurements and testing that do not meet concrete floor finishing performance requirements for interior concrete floor finishing described in this Section.
- .2 Contractor's Contributions: Contractor is responsible for managing coordinated-source concrete placing, finishing and curing of concrete described in this Section in accordance with CSA A23.1, Part 7 and the following:
 - .1 Contractor will establish control points for floor measurements as a component of their QMP provisions to quantify amount of materials required to meet Floorcovering Qualitative Tolerance (Straightedge).
 - .2 Contractor will manage Trades contributions for site measurements of concrete slabs to establish Concrete Quantitative Tolerance and Floorcovering Qualitative Tolerance (Straightedge).

- .3 Contractor will notify Owner and Consultant of differential between calculated concrete finishing tolerances to observed concrete finishing tolerances; Consultant will provide written direction for adjustment to unit price allowance.
- .4 Contractor prepares or adds content to their QMP that describes their approach for identifying and correcting deficient work.
- .3 Trade's Contributions: Trades are responsible for managing surface tolerance requirements as follows:
 - .1 Trade will perform measurement and testing specified in specification Sections associated with their work result.
 - .2 Trade will confirm the Contractor's QMP modifications following pre-construction meetings specified above that they require to achieve specified tolerances.
- .4 Manufacturers' Contributions: Manufacturers will provide written instructions to Trades identifying product installation requirements including modifications to standard procedures, measurements and testing necessary to achieve specified concrete floor finishing performance requirements.

3.04 SITE QUALITY CONTROL

- .1 Contractor's Quality Management: QMP will list measurements and testing, and identify Trades responsible for site quality control requirements required to achieve floor finishing performance requirements identified in this Section.

3.05 CLEANING

- .1 Cleaning: Keep installed work clean as installation progresses and perform final cleaning. Refer to Section 01 74 00.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.
- .2 Work may include, but is not limited to;
 - .1 Alterations and renovations to existing building.
 - .2 Patching and making good of all openings and chases in walls, floors, ceilings and including the supply and installation of lintels, channels, supports and finishes as necessary.
 - .3 Removal of all abandoned services such as conduits, pipes, wiring, ducts, fixtures, or equipment as necessary for the Work of this Section.
 - .4 Salvaging of items as noted herein.

1.02 REFERENCES

- .1 Ontario Regulation 102/94 - Waste Audits and Waste Reduction Work Plans.

1.03 ADMINISTRATIVE REQUIREMENTS

- .1 Site Meetings: Convene pre-demolition meeting one week prior to beginning work of this Section in accordance with Section 01 31 19 to:
 - .1 Verify project requirements.
 - .2 Review existing conditions adjacent to demolition work.
 - .3 Co-ordinate with other building subtrades.
 - .4 Ensure key personnel attend.
 - .5 Waste management coordinator must provide written report on status of waste diversion activity at each meeting.
- .2 Scheduling: Meet project time lines without compromising specified minimum rates of material diversion. Notify Consultant in writing when unforeseen delays occur.

1.04 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Shop Drawings: Submit Shop Drawings as follows:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Submit for approval drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning, where required by authorities having jurisdiction.

- .3 Waste reduction workplan: Prior to beginning of Work on site, submit detailed Waste Reduction Workplan in accordance with Ontario Regulation 102/94 indicating:
 - .1 Descriptions of and anticipated quantities in percentages of materials to be salvaged, reused, recycled and landfilled.
 - .2 Schedule of demolition.
 - .3 Number and location of dumpsters.
 - .4 Anticipated frequency of tippage.
 - .5 Name and address of waste facilities.
- .4 Certificates:
 - .1 Submit copies of certified receipts from authorized disposal sites and reuse and recycling facilities for material removed from site upon request of Consultant.
 - .2 Written authorization from Consultant is required to deviate from facilities listed in Waste Reduction Workplan.

1.05 QUALITY ASSURANCE

- .1 Regulatory Requirements: Ensure Work is performed in compliance with CEPA, CEAA, TDGA and applicable Provincial/Territorial and Municipal regulations.

1.06 DELIVERY, STORAGE, AND HANDLING

- .1 Storage and protection:
 - .1 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Consultant and at no cost to Consultant.
 - .2 Remove and store materials to be salvaged, in manner to prevent damage.
 - .3 Store and protect in accordance with requirements for maximum preservation of material.
 - .4 Handle salvaged materials as new materials.

1.07 SITE CONDITIONS

- .1 Environmental Requirements:
 - .1 Ensure that demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
 - .2 Fires and burning of waste or materials is not permitted on site.
 - .3 Do not bury rubbish waste materials.
 - .4 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
 - .5 Ensure proper disposal procedures are maintained throughout the project.

- .6 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.
- .7 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.
- .8 Protect trees, plants and foliage on site and adjacent properties where indicated.
- .9 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.
- .10 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.
- .2 Existing Conditions:
 - .1 Remove contaminated or hazardous materials as directed by Consultant from site, prior to start of demolition Work, and dispose of at designated disposal facilities in safe manner in accordance with TDGA and other applicable regulatory requirements.

2 PRODUCTS

2.01 N/A

3 EXECUTION

3.01 PREPARATION

- .1 Protection of in-place conditions:
 - .1 Perform work in accordance with Erosion and Sedimentation Control Plan.
 - .2 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, adjacent grades, and parts of existing building to remain.
 - .1 Provide bracing, shoring and underpinning as required.
 - .2 Repair damage caused by demolition as directed by Consultant.
 - .3 Support affected structures and, if safety of structure being demolished or adjacent structures or services appears to be endangered, take preventative measures, stop Work and immediately notify Consultant.
 - .4 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.
- .2 Inspect site with Consultant and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .3 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .4 Notify and obtain approval of utility companies before starting demolition.

- .5 Disconnect and cap mechanical services:
 - .1 Natural gas supply lines: remove in accordance with gas company requirements.
 - .2 Sewer and water lines: remove as indicated on drawings.
 - .3 Other underground services: remove and dispose of as indicated on drawings.
 - .4 Do not disrupt active or energized utilities designated to remain undisturbed.
- .6 Perform rodent and vermin removal as required by Consultant.

3.02 DEMOLITION

- .1 Blasting operations are not permitted during demolition.
- .2 Remove contaminated or dangerous materials as defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.
- .3 Remove contaminated or dangerous materials defined by authorities having jurisdiction, from Site and dispose of at designated disposal facilities in safe manner and in accordance with TDGA and other applicable requirements.
- .4 Demolish parts of structure to permit renovation work as indicated.
- .5 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.
- .6 At end of each day's work, leave Work in safe and stable condition.
- .7 Protect interiors of parts not to be demolished from exterior elements at all times.
- .8 Demolish to minimize dusting. Keep materials wetted as directed by Consultant.
- .9 Demolish masonry and concrete walls.
- .10 Remove structural framing.
- .11 Contain fibrous materials to minimize release of airborne fibres while being transported within facility.
- .12 Remove and dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction.
- .13 Remove doors including door frames and door hardware.

- .14 Remove interior partitions, fittings, fixtures and accessories as indicated on drawings. Partitions and walls shall be removed full height to structure above.
- .15 Remove interior finishes including ceiling, wall and floor finishes where new finishes are indicated on drawings:
 - .1 Removal of existing ceilings shall include complete removal including bulkheads and suspension system.
 - .2 Removal of adhesive applied finishes shall include complete removal to substrate including adhesive. Take adequate care to prevent damage to substrate.
 - .3 Removal of existing tile finishes shall include mortar bed, underlayment, base, and transition strips.
- .16 Remove materials and equipment noted on drawings and store in location designated by Consultant.
- .17 Use natural lighting to do Work where possible. Shut off lighting except those required for security purposes at end of each day.

3.03 CLEANING

- .1 Waste Management: separate waste materials for reuse and recycling as outlined in Waste Management Plan.
- .2 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .3 Divert excess materials from landfill to site approved by Consultant.
- .4 Designate appropriate security resources/measures to prevent vandalism, damage and theft.
- .5 Separate from general waste stream each of following materials, as applicable. Stockpile materials in neat and orderly fashion in location and as directed by Consultant for alternate disposal. Stockpile materials in accordance with applicable fire and safety regulations:
 - .1 Glass fibre ceiling tiles.
 - .2 Wood fibre ceiling tiles.
 - .3 Power source poles deemed unfit for reuse by Consultant.
 - .4 Wiring and conduit.
 - .5 Outlets/switches.
 - .6 Floor receptacles.
 - .7 Metal duct work, baffles, HVAC equipment.
 - .8 Demountable partitions.
 - .9 Drapes.
 - .10 Tracks and blinds.

- .11 Insulation batts.
- .12 Miscellaneous metals.
- .13 Carpet.

- .6 Supply separate, clearly marked disposal bins for categories of waste material.

- .7 Remove stockpiled material as directed by Consultant, when it interferes with operations of project construction.

- .8 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.

- .9 Transport material designated for alternate disposal using approved facilities listed in Waste Reduction Workplan and in accordance with applicable regulations. Written authorization from Consultant is required to deviate from facilities listed in Waste Reduction Workplan.

- .10 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.
 - .1 Disposal facilities must be those approved of and listed in Waste Reduction Workplan.
 - .2 Written authorization from Consultant is required to deviate from disposal facilities listed in Waste Reduction Workplan.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.
- .2 Work may include, but is not limited to;
 - .1 Concrete sealer for use under access flooring.

1.02 REFERENCES

- .1 CSA A23.1/A23.2 - Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

1.03 ADMINISTRATIVE REQUIREMENTS

- .1 Site Meetings: Arrange a pre-installation meeting on Site to be attended by Consultant, Contractor, concrete sealer manufacturer's representative, and any other parties directly affecting work of this Section to:
 - .1 Review division of responsibilities, floor joint layout and mock-up requirements.
 - .2 Examine substrate conditions for compliance with manufacturer's requirements.
 - .3 Review methods and procedures related to installation.
 - .4 Review all typical and special details as required to complete the work of this section.

1.04 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for concrete floor sealer including product characteristics, performance criteria, and limitations. Include application instructions for concrete floor treatments.
- .3 Samples: Submit 300 mm x 300 mm samples illustrating colour and finish of concrete floor sealer.

1.05 QUALITY ASSURANCE

- .1 Installers: Perform Work of this Section by a company that has a minimum of five (5) years proven experience in the application of concrete floor sealers of a similar size and nature.

- .2 Mock-ups:
 - .1 Construct one (1) mock-up of each type of concrete finish in location as directed by Consultant.
 - .2 Mock-up shall be 300 mm x 300 mm and demonstrate methods, materials, and procedures proposed to achieve concrete finishes using materials indicated for completed work.
 - .3 Mock-up may form part of the Work if accepted by the Consultant.

1.06 SITE CONDITIONS

- .1 Temporary lighting: Minimum 1200 W light source, placed 2.5 m above floor surface, for each 40 sq 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.
- .4 Ambient Conditions and relative humidity: Work of this Section shall be performed when air and surface temperatures are above 10 degree C from 7 days before application to minimum 48 hours after completion of work. Maintain relative humidity no higher than 40% during same period.
- .5 Moisture: Ensure concrete substrate is within moisture limits prescribed by flooring manufacturer.
- .6 Ventilation:
 - .1 Ventilate area of work as directed by Consultant by use of approved portable supply and exhaust fans.
 - .2 Ventilate enclosed spaces in accordance with the Conditions of the Contract.
 - .3 Provide continuous ventilation during and after coating application.

2 PRODUCTS

2.01 PERFORMANCE CRITERIA

- .1 Submit written declaration that components used are compatible and will not adversely affect finished flooring products and their installation adhesives.

2.02 MATERIALS

- .1 Concrete floor sealer: Clear, zero Voc concrete floor hardener and densifier:
 - .1 Surfhard by Euclid Chemical.
 - .2 Sikafloor-3S by Sika.

- .3 Liqui-Hard Ultra by W. R. Meadows.
- .4 Or approved equal.

- .2 Sealant: Two-part, semi-rigid epoxy joint filler
 - .1 Euco 700 by Euclid Chemical.
 - .2 Reziweld-Flex by W.R. Meadows.
 - .3 or approved equal.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.
- .2 Verify that slab surfaces are ready to receive work and elevations are as indicated on Shop Drawings and as recommended by manufacturer's written instructions.

3.02 PREPARATION OF EXISTING SLAB

- .1 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radiused edges unless otherwise indicated.
- .2 Saw cut control joints to CSA A23.1/A23.2, 24 hours maximum after placing of concrete.
- .3 Use mechanical stripping to remove existing surface coatings.

3.03 APPLICATION

- .1 Apply concrete finishing floor hardener in accordance with manufacturer's written instructions.
- .2 Seal control joints and joints at junction with vertical surfaces with sealant.
- .3 Clean over spray. Clean sealant from adjacent surfaces.

3.04 PROTECTION

- .1 Protect finished installation in accordance with manufacturer's instructions.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.
- .2 Work may include, but is not limited to;
 - .1 Metal Stairs.
 - .2 Pipe Railings.
 - .3 Angle Lintels.
 - .4 Miscellaneous metal fabrications as indicated on drawings.

1.02 REFERENCES

- .1 ASTM A123/A123M - Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
- .2 ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.
- .3 ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions.
- .4 CSA G40.20-13/G40.21 - General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .5 CSA S16 - Design of Steel Structures.
- .6 CSA W47.1 - Certification of Companies for Fusion Welding of Steel.
- .7 CSA W48 - Filler Metals and Allied Materials for Metal Arc Welding.
- .8 CSA W59 - Welded Steel Construction (Metal Arc Welding).
- .9 NAAMM AMP 510 - Metal Stair Manual.
- .10 NAAMM AMP 521 - Pipe Railing Systems Manual.
- .11 NAAMM AMP 555 - Code of Standard Practice for the Architectural Metal Industry.
- .12 National Ornamental & Miscellaneous Metals Association (NOMMA).

1.03 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for metal fabrications including product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings: Submit Shop Drawings as follows:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
 - .3 Stair construction details, sizes of steel sections and thickness of steel sheet.
- .4 Reports and certifications: Submit the following:
 - .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
 - .2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.04 QUALITY ASSURANCE

- .1 Certification of companies: to CSA W47.1 as applicable for fusion welding.
- .2 Workmanship: Fabricate work of this Section to meet the required class of workmanship indicated below in accordance with NAAMM AMP 555 (NOMMA), Class 2 as follows:
 - .1 Exposed surfaces retain mill marks and moderate irregularities not visible by naked eye at 10 metres. Ensure burrs and sharp edges are filed down or ground off.
 - .2 Exposed welds are ground with uniform sized cove.
 - .3 Minor distortions are permitted.
 - .4 Exposed joints have a maximum gap of 1.5 mm.

2 PRODUCTS

2.01 PERFORMANCE CRITERIA

- .1 Design metal fabrications to resist loads and climatic data as indicated, and in accordance with applicable building codes.
- .2 Design metal stair, balustrade and landing construction and connections to NBC vertical and horizontal live load requirements.

- .3 Design and fabricate stairs to NAAMM AMP 510. Stairs to be fabricated to Commercial Class.
- .4 Design and fabricate handrails to NAAMM AMP 521. Railing joints shall be completed to Type 2.

2.02 MATERIALS - GENERAL

- .1 Steel sections and plates: to CSA G40.20/G40.21, Grade 350W, minimum 30% recycled content.
- .2 Welding materials: to CSA W59.
- .3 Welding electrodes: to CSA W48 Series.
- .4 Bolts and anchor bolts: to ASTM A307.
- .5 High strength bolts: to ASTM F3125/F3125M.
- .6 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

2.03 MATERIALS - METAL STAIRS

- .1 Steel sections and plates: to CSA G40.20/G40.21, Grade 300W, minimum 30% recycled content.
- .2 Steel plate: to CSA G40.20/G40.21, Grade 260 W, minimum 30% recycled content.
- .3 Steel tubing: to CSA G40.20/G40.21, round, sizes and dimensions as indicated.

2.04 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 Where possible, fit and shop assemble work, ready for erection.
- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.05 FINISHES

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m², Coating Grade 85, to ASTM A123/A123M.
- .2 Shop coat primer: Refer to Section 09 91 00 for paint system.
- .3 Zinc-rich primer:
 - .1 Carbozinc 11WB by Carboline.
 - .2 Dimetcote 9H by PPG.
 - .3 Zinc Clad XL by Sherwin Williams.

2.06 ISOLATION COATING

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

2.07 SHOP PAINTING

- .1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.
- .2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.
- .3 Clean surfaces to be field welded; do not paint.

2.08 SCHEDULE OF FABRICATIONS

- .1 Refer to drawings for metal fabrications items not specifically listed in this Section. Metal fabrications shall include, but not be limited to, the items listed below.
- .2 Metal Stairs:
 - .1 Fabricate in accordance with 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:
 - .1 Make mitres and joints tight.
 - .2 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 Stair treads: to be wood blocking in accordance with Section 06 10 00.

- .3 Pipe Railings:
 - .1 Steel pipe: 38 mm nominal outside diameter, formed to shapes and sizes as indicated.
 - .2 Galvanize exterior pipe railings after fabrication. Shop coat prime interior railings after fabrication.
- .4 Angle Lintels:
 - .1 Steel angles: galvanized, sizes indicated for openings. Provide 150 mm minimum bearing at ends.
 - .2 Weld or bolt back-to-back angles to profiles as indicated.
 - .3 Finish: Shop painted.
- .5 Miscellaneous brackets, supports and angles:
 - .1 Provide all loose steel brackets, supports and angles as indicated or required to support Work.
 - .2 Allow for prime paint for interior use and galvanized for exterior use unless indicated otherwise.
 - .3 Predrill for countersunk fasteners, expansion anchors and anchor bolts.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.02 INSTALLATION

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 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 connections.

- .7 Deliver items over for casting into concrete and building into masonry together with setting templates to appropriate location and construction personnel.
- .8 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.
- .9 Pipe railings:
 - .1 Set railing standards in concrete.
 - .2 Grout to fill hole. Trowel surface smooth and flush with adjacent surfaces.
- .10 Touch-up rivets, field welds, bolts and burnt or scratched surfaces with primer after completion.
- .11 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

3.03 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by metal stairs and ladders installation.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.
- .2 Work may include, but is not limited to;
 - .1 Glazed aluminum channel railing system.

1.02 REFERENCES

- .1 AAMA 611 - Voluntary Specifications for Anodized Finishes Architectural Aluminum.
- .2 ASTM A167 - Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .3 ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
- .4 ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes.
- .5 ASTM A312/A312M - Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
- .6 ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip.
- .7 ASTM B209 - Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
- .8 ASTM B221 - Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
- .9 ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- .10 ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants.
- .11 CSA A500 - Building Guards.
- .12 CSA S157 - Strength Design in Aluminum.

1.03 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Co-ordinate work of this Section with installation of additional supports, glazing, and components or materials.

1.04 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for glazed metal railing systems including anchorage and fasteners, glass and infill, and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings: Submit Shop Drawings as follows:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Shop Drawings to illustrate details, dimensions, fabrication and installation details.
 - .3 Indicate metal finishes and glazing types.
 - .4 Anchorage methods, allowances for movement including expansion and contraction, and tolerances.
- .4 Samples: Submit samples illustrating colours, textures and finishes including, but not limited to:
 - .1 300 mm long sample of extrusion with final finish.
 - .2 300 mm x 300 mm samples of glass.

1.05 CLOSEOUT AND MAINTENANCE SUBMITTALS

- .1 Submit closeout and maintenance submittals in accordance with Section 01 78 00.
- .2 Closeout Product data: Submit manufacturers maintenance and cleaning data for incorporation into operation and maintenance manual including product warranty documentation.

1.06 QUALITY ASSURANCE

- .1 Manufacturers: Company specializing in manufacturing the products specified in this section with minimum 5 years experience.
- .2 Installers: Perform Work of this Section by a company that has a minimum of five (5) years proven experience in the installation of glazed railing systems of a similar size and nature.

1.07 DELIVERY, STORAGE, AND HANDLING

- .1 Protect prefinished surfaces with wrapping or strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1.08 SITE CONDITIONS

- .1 Ambient Conditions: Install sealants when ambient and surface temperature is above 5 degrees C minimum. Maintain this minimum temperature during and for 48 hours minimum after installation of sealants.

2 PRODUCTS

2.01 SYSTEMS AND MANUFACTURERS

- .1 Channel Support Glazed Railing System (GL1):
 - .1 Base shoe: Minimum 100 mm high standard B5S Series square aluminum base shoe by CRL.
 - .2 Exposed glass cap: Provide square low profile GRS Series top cap by CRL for exposed glass panels complete with cap rail vinyl.
 - .3 Glass: 12 mm thick tempered glass.
 - .4 Metal finish: brushed stainless steel.
 - .5 Basis of Design Manufacturer:
 - .1 C.R. Laurence.
 - .2 Inkan Limited.
 - .3 Or Consultant approved equal.
- .2 Glass mounted handrail (MT2):
 - .1 Glass mounted bracket with gaskets HRS Series by CRL complete with 38 mm diameter handrail tubing.
 - .2 Metal finish: brushed stainless steel.
 - .3 Basis of Design Manufacturer:
 - .1 C.R. Laurence.
 - .2 Inkan Limited.
 - .3 Or Consultant approved equal.

2.02 PERFORMANCE CRITERIA

- .1 Design glazed metal railing system to be able to withstand the following structural loads without exceeding allowable design working stress of materials:
 - .1 Concentrated load: 200 lbf applied at any point and in any direction.
 - .2 Uniform load: 50 lb per linear foot applied horizontally and concurrently with uniform load of 50 lb per linear foot applied vertically downward.

- .2 Design glazed metal railing system to conform to CSA A500, and CSA S157/S157.1.
- .3 Design glazed metal railing systems to resist thermal movement, loads and climatic data for the Place of the Work.

2.03 MATERIALS

- .1 Extruded aluminum: To ASTM B221, high strength 6106 alloy with T6 temper.
- .2 Sheet aluminum: To ASTM B209, utility grade for unexposed surfaces.
- .3 Stainless steel sheet and plate: to ASTM A480/A480M, Type 316.
- .4 Stainless steel bar: to ASTM A240/A240M, Type 316.
- .5 Stainless steel pipes and tubing: to ASTM A312/A312M, Type 316.
- .6 Glass and glazing: In accordance with Section 08 81 00.
- .7 Fasteners, screws and bolts: Tamperproof, stainless steel to meet glazed metal railing system requirements and as recommended by manufacturer.
- .8 Anchors: Stainless steel.
- .9 Sealant Materials:
 - .1 Sealant:
 - .1 Single-component, neutral cure, silicone sealant conforming to ASTM C920, Type S, Grade NS, Class 50.
 - .2 Colour: To be selected by Consultant.
 - .3 Basis of Design:
 - .1 Dowsil 795 Silicone Building Sealant by Dow.
 - .2 Sikasil WS-295 by Sika Canada.
 - .3 Spectrum 2 by Tremco.
 - .4 Or approved equal.
 - .2 Joint backing: to ASTM C1330; Round, solid section, soft polyethylene foam gasket compatible with primer and sealant materials.
 - .3 Primer: As recommended by sealant manufacturer.

2.04 FABRICATION

- .1 Accurately fit and secure joints and corners. Make joints flush, smooth, rigid and hairline.
- .2 Construct railing supports square, plumb and free from distortion, waves, twists, buckles or other defects detrimental to performance or appearance.

- .3 Arrange fasteners and attachments to ensure concealment from view.
- .4 Prepare glazed metal railing supports to receive glazing as indicated on drawings.
- .5 Visible manufacturer's identification labels not permitted.

2.05 FINISHES

- .1 Aluminum finishes: To AAMA 611, Architectural Class I anodized.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.
- .2 Verify substrates are ready to receive work of this Section.

3.02 INSTALLATION

- .1 Install glazed metal railing systems in accordance with reviewed Shop Drawings and manufacturer's written instructions.
- .2 Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- .3 Fit exposed connections together to form tight, hairline joints.
- .4 Align railings so variations from level for horizontal members and from parallel with rake of steps and ramps for sloping members do not exceed 5 mm in 3 m.
- .5 Adjust handrails and railings before anchoring to ensure alignment at abutting joints. Space posts at interval indicated, but not less than that required by structural loads.
- .6 Install glass in accordance with Section 08 81 00.
- .7 Install sealant in accordance with Section 07 92 00.
- .8 Provide glass presence markers as approved by system manufacturer. Markers are to be installed in two cross stripes extending from diagonal corners.

3.03 CLEANING

- .1 Leave Work area clean at end of each day.
- .2 Remove protective material and glass presence markers.
- .3 Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.
- .2 Work may include, but is not limited to;
 - .1 Blocking, furring and miscellaneous framing/supports.
 - .2 Electrical mounting boards.
 - .3 Wood stair treads.

1.02 REFERENCES

- .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 (Galvannealed) by the Hot-Dip Process.
- .3 ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.
- .4 CAN/CSA O80 Series - Wood Preservation.
- .5 CSA O121 - Douglas Fir Plywood.
- .6 CSA O141 - Softwood Lumber.
- .7 CSA O151 - Canadian Softwood Plywood.
- .8 CAN/CSA Z809 - Sustainable Forest Management.
- .9 National Lumber Grades Authority (NLGA) - Standard Grading Rules for Canadian Lumber.

1.03 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.

1.04 QUALITY ASSURANCE

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

- .2 Plywood identification: by grade mark in accordance with applicable CSA standards.
- .3 Plywood, OSB and wood based composite panel construction sheathing identification: by grademark in accordance with applicable CSA standards.
- .4 Each board or bundle of fire-retardant treated material to bear ULC label indicating Flame Spread Classification (FSC), and smoke developed.

1.05 DELIVERY, STORAGE, AND HANDLING

- .1 Store materials in a dry area. Cover materials with tarpaulins or polyethylene sheets to prevent moisture absorption and impairment of structural and aesthetic properties. Vent to allow air movement. Tie covering to keep in place.

2 PRODUCTS

2.01 PERFORMANCE CRITERIA

- .1 Design wood stair treads in accordance with the building code and to withstand loads as follows:
 - .1 Live loads: designed for minimum 488 kg/m² (100 psf) as required.

2.02 MATERIALS

- .1 General:
 - .1 CAN/CSA Z809, SFI or Forestry Stewardship Council (FSC) certified.
 - .2 Lumber dimensions shall conform to dressed sizes specified in CAN/CSA O141 unless otherwise indicated or specified.
 - .3 Dimensional references to lumber are to nominal sizes unless actual dimensions are indicated. Such actual dimensions shall be dry size.
- .2 Lumber: unless specified otherwise, softwood, S4S, S-DRY Lumber graded and stamped in accordance with following standards:
 - .1 CSA O141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
- .3 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers: to NLGA 113d. and 121c., S4S.
 - .1 S2S is acceptable for concealed work.
 - .2 Board sizes: "Standard" or better grade.
 - .3 Dimension sizes: "Standard" light framing or better grade.
- .4 Douglas fir plywood: to CSA O121, SEL TF grade, unsanded unless noted otherwise. Urea-formaldehyde free adhesive.

- .5 Canadian softwood plywood (CSP): to CSA O151, Class II, sheathing. Urea-formaldehyde free.
- .6 Nails, spikes and staples: to ASTM F1667.
- .7 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.
- .8 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.

2.03 FINISHES

- .1 Galvanizing: to ASTM A123/A123M and ASTM A653/A653M as applicable, use galvanized fasteners for exterior work, interior high humidity areas, pressure-preservative and fire treated lumber.
- .2 Stainless steel: use stainless steel Type 304 or 316 alloy for structural components.

2.04 WOOD TREATMENTS

- .1 Wood Preservative:
 - .1 Wood preservation plants: certified by Canadian Wood Preservation Authority (CWPCA) to Environment Canada Technical Recommendation Document for the Design and Operation of Wood Preservation Facilities.
 - .2 Pressure treatment to be waterborne copper-based system conforming to CAN/CSA O80 Series standards, Use Category 3.2.
 - .3 Surface-applied wood preservative: waterborne copper-based system as used for shop impregnation or copper naphthenate, for use on all cut components.
- .2 Fire Retardant:
 - .1 Provide fire retardant treated lumber for interior use conforming to CAN/CSA O80 Series, to provide the following characteristics when tested in accordance with CAN/ULC-S102:
 - .1 Flame Spread Classification: Class A.
 - .2 Smoke developed of not more than: 25.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.02 PREPARATION

- .1 Treat surfaces of material with wood preservative, before installation.
- .2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and one minute soak on plywood.
- .3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.
- .4 Treat material as follows:
 - .1 Wood cants, fascia backing, curbs, nailers, sleepers on roof deck.
 - .2 Wood furring on outside surface of exterior masonry and concrete walls.
 - .3 Wood sleepers supporting wood subflooring over concrete slabs in contact with ground or fill.

3.03 INSTALLATION

- .1 Lay out work carefully and to accommodate work of others. Cut and fit all components and erect in position indicated by Drawings.
- .2 Install rough carpentry to allow for expansion and contraction of materials.
- .2 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding and other work as required.
- .3 Align and plumb faces of furring and blocking to tolerance of 1:600.
- .4 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .5 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.
- .6 Install wood backing, dressed, tapered and recessed slightly below top surface of roof insulation for roof hopper.
- .7 Install sleepers as indicated.
- .8 Use caution when working with particle board. Use dust collectors and high quality respirator masks.
- .9 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.

- .10 Countersink bolts where necessary to provide clearance for other work.

3.04 SCHEDULE OF ITEMS

- .1 Electrical equipment mounting boards:
 - .1 Use plywood on 19 x 38 mm furring around spacing, perimeter and at maximum 300 mm intermediate.
 - .2 Plywood, DFP, G1S grade, square edge, 19 mm thick sanded to Table E.1.
 - .3 Fire retardant treated to CAN/CSA O80 Series, maximum flame spread 25, maximum smoke developed 25.
- .2 Wood decking:
 - .1 Ensure acceptable support base below pedestals and install pedestals in accordance with manufacturers written instructions adjusting each to provide level decking surface.
 - .2 Use 50 mm x 100 mm wood decking with hot dipped galvanized connectors, nails and bolts. Finish wood in accordance with Section 09 91 00.
 - .3 Install decking on 50 mm x 50 mm sleepers placed at 1200 mm o.c.
- .3 Stair treads:
 - .1 Provide 32 mm wood blocking stair treads for use at access flooring stairs.
 - .2 Install stair treads to steel stringer provided under Section 05 50 00.

3.05 QUALITY CONTROL

- .1 Discard wood with defects which will render a piece unable to serve its intended function.
- .2 Lumber will be rejected by Consultant for excessive warp, twist, bow, crook, mildew, fungus, or mould, as well as for improper cutting and fitting, whether or not it has been installed.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.
- .2 Work may include, but is not limited to;
 - .1 Trims and frames.
 - .2 Panelling.
 - .3 Handrails.
 - .4 Millwork and shelving.
 - .5 Counters.

1.02 REFERENCES

- .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.
- .4 ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- .5 ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.
- .6 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Woodwork Institute (WI) - NAAWS North American Architectural Woodwork Standards.
- .7 ANSI/BHMA A156.9 - Cabinet Hardware.
- .8 ANSI/BHMA A156.11 - Cabinet Locks.
- .9 CSA O121 - Douglas Fir Plywood.
- .10 CSA O141 - Softwood Lumber.
- .11 CSA O151 - Canadian Softwood Plywood.
- .12 CSA O153 - Poplar Plywood.
- .13 CAN/CSA Z809 - Sustainable Forest Management.

- .14 ISO 4586 Series - High-Pressure Decorative Laminates (HPL, HPDL), Sheets based on thermsetting resins.
- .15 National Lumber Grades Authority (NLGA) - Standard Grading Rules for Canadian Lumber.
- .16 NSF/ANSI 51 - Product Certifications for Food and Drinking Water.
- .17 CAN/ULC S102 - Surface Burning Characteristics of Building Materials and Assemblies.

1.03 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for finish carpentry including product characteristics, performance criteria, and limitations.
- .3 Shop Drawings: Submit Shop Drawings as follows:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Shop Drawings to Indicate details of construction, profiles, jointing, fastening and other related details.
 - .3 Indicate materials, thicknesses, finishes and hardware.
 - .4 Indicate locations of service outlets in casework, typical and special installation conditions, and connections, attachments, anchorage and location of exposed fastenings.
- .4 Samples: Submit 150 mm x 150 mm samples illustrating colours, textures and finishes including, but not limited to:
 - .1 Two pieces of each species/type of wood to receive a exposed finish.
 - .2 Two samples of laminated plastic for colour selection.
 - .3 Two each of laminated plastic joints, edging, and postformed profiles.
 - .4 Two pieces of each solid surface colour/finish.
 - .5 Two samples of melamine surfaced board, edging and postformed profiles.
 - .9 One of each finish carpentry hardware type.
- .5 Reports/certificates: Submit the following:
 - .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
 - .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.04 QUALITY ASSURANCE

- .1 Manufacturers: Manufacturers to be a member in good standing of AWMAC with 5 years experience of similar complexity and scope. Proof to be submitted upon request.
- .2 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .3 Lumber by grade stamp of agency certified by Canadian Lumber Standards Accreditation Board (CLSAB).
- .4 Plywood, particleboard, OSB and wood based composite panels to CSA and ANSI standards.
- .5 Mock-ups:
 - .1 Construct one (1) mock-up of cabinet, and counter top, complete with hardware and shop applied finishes, and install where directed by Consultant.
 - .2 Allow 24 hours for inspection of mock-up by Consultant before proceeding with Work.
 - .3 When accepted, mock-up will demonstrate minimum standard for Work.
 - .4 Do not proceed with work prior to receipt of written acceptance of mock-up by Consultant.
 - .5 Mock-up may form part of the Work if accepted by the Consultant.

1.05 DELIVERY, STORAGE, AND HANDLING

- .1 Store materials in a dry area. Cover materials with tarpaulins or polyethylene sheets to prevent moisture absorption and impairment of structural and aesthetic properties. Vent to allow air movement. Tie covering to keep in place.
- .2 Protect millwork against dampness and damage during and after delivery.
- .3 Store millwork in ventilated areas, protected from extreme changes of temperature or humidity.
- .4 Store and protect finish carpentry from nicks, scratches, and blemishes.
- .5 Replace defective or damaged materials with new.

2 PRODUCTS

2.01 MATERIALS

- .1 General:
 - .1 CAN/CSA Z809, SFI or Forestry Stewardship Council (FSC) certified.
 - .2 Dimensional references to lumber are to nominal sizes unless actual dimensions are indicated. Such actual dimensions shall be dry size.
 - .3 AWMAC/WI North American Architectural Woodwork Standards premium grade, moisture content as specified.
 - .4 Perform work in accordance with the definition of First-Class Workmanship as defined in the NAAWS Quality Standards.
- .2 Softwood lumber: S4S, S-DRY graded and stamped in accordance with following standards:
 - .1 CSA O141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
- .3 Hardwood lumber: moisture content 7 % or less in accordance with National Hardwood Lumber Association (NHLA).
- .4 Panel Material: Urea-formaldehyde free:
 - .1 Douglas fir plywood (DFP): to CSA O121, standard construction.
 - .2 Canadian softwood plywood (CSP): to CSA O151, standard construction.
 - .3 Hardwood plywood: to ANSI/HPVA HP-1.
 - .4 Poplar plywood (PP): to CSA O153, standard construction.
 - .5 Particleboard: to ANSI A208.1.
 - .6 Medium density fibreboard (MDF) core: to ANSI A208.2, density 640-800 kg/m³.
- .5 Plastic laminate: Decorative surface papers impregnated with melamine resins and pressed over kraft paper core sheets to ISO 4586 series.
 - .1 Type: General purpose as follows:
 - .1 Grade: HGS.
 - .2 Size: 1.27 mm thick.
 - .2 Colours: Confirm colour selection with Consultant prior to purchasing.
 - .1 MW1: to match F3588 Clear Maple by Formica.
 - .2 MW2: to match 0902 Platinum by Formica.
 - .3 MW3: to match M2178 Brushed Stainless Steel by Formica.
 - .4 P.LM: to match F3855 Clear Maple by Formica.
 - .3 Basis of Design manufacturers:
 - .1 Arborite Company.
 - .2 Formica Group.
 - .3 Panolam Surface Systems.
 - .4 Wilsonart Engineered Surfaces.

- .4 Laminated plastic adhesive:
 - .1 General purpose laminate: High solids, low VOC contact adhesive.
- .6 Solid surface:
 - .1 Minimum 12 mm thick non-porous, homogeneous material consisting of acrylic polymer, aluminum trihydrate filler and pigment complying to NSF/ANSI 51.
 - .2 Flammability: to CAN/ULC S102.
 - .1 Flame spread index: 0.
 - .2 Smoke developed index: 5.
 - .3 Adhesive: One component silicone to ASTM C920 as approved by solid surface manufacturer.
 - .4 Colour: Confirm colour selection with Consultant prior to purchasing.
 - .1 SS1: to match 757 Luna Sand by Formica.
 - .5 Basis of Design:
 - .1 Corian by DuPont.
 - .2 Everform by Formica Group.
 - .3 Staron by Lotte Chemical.
 - .4 Wilsonart Solid Surface by Wilsonart Engineered Surfaces.
- .7 Nails and staples: to ASTM F1667.
- .8 Wood screws: plain, type and size to suit application.
- .9 Splines: Type as recommended by fabricator.
- .10 Sealant: in accordance with Section 07 92 00.

2.02 FINISHING HARDWARE

- .1 Use one manufacturer's product for all similar items.
- .2 The following hardware is the minimum quality standard for the work of this Section. Alternatives may be considered provided they are approved by Consultant prior to ordering of products.
- .3 Cabinet hardware: to ANSI/BHMA A156.9, as follows:
 - .1 Hinges: Full overlay, heavy duty hinge with hinge cup.
 - .1 Finish: Nickel.
 - .2 Basis of Design: Single-joint hinge MB-8310 by Richelieu or approved equal.
 - .2 Pulls: 8 mm diameter x 128 mm center to center.
 - .1 Finish: Brushed Nickel.
 - .2 Basis of Design: Contemporary Metal Pull 2288 by Richelieu or approved equal.

- .3 Catches: magnetic catch, double magnetic aluminum catch by Richelieu or approved equal.
- .4 Shelf supports and standards: Stainless steel shelf support clip with vertical slotted shelf standard in satin finish by Richelieu or approved equal.
 - .1 Finish: Satin.
 - .2 Basis of Design: Stainless Steel Pilaster with Shelf Support for Standard by Richelieu or approved equal.
- .5 Drawer slides: Concealed undermount drawer slides, rated for 45 kg load capacity. Slides to be full extension with soft close.
 - .1 Basis of Design: Eclipse 3160EC by Accuride or approved equal.
- .4 Cabinet locks: to ANSI/BHMA A156.11, as follows:
 - .1 Door or drawer locks: To suit application and containing lock core.
 - .2 Cylinders: key into keying system as directed.

2.03 FABRICATION

- .1 Fabricate carpentry and millwork to AWMAC/WI NAAWS premium quality grade.
- .2 Set nails and countersink screws apply matching wood filler to indentations, sand smooth and leave ready to receive finish.
- .3 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.
- .4 Shelving to cabinetwork to be adjustable unless otherwise noted.
- .5 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.
- .6 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.
- .7 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.
- .8 Perform plastic laminate work in accordance with NAAWS and ISO 4586 Series.
- .9 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .10 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 cutouts.

- .11 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.
- .12 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.
- .13 Apply laminate backing sheet to reverse side of core of plastic laminate work.
- .14 Apply laminated plastic liner sheet where indicated.

2.04 FINISHES

- .1 Refer to Section 09 91 00.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.02 INSTALLATION

- .1 Do architectural woodwork to AWMAC/WI NAAWS.
- .2 Install prefinished millwork at locations shown on drawings.
- .3 Position accurately, level, plumb straight.
- .4 Fasten and anchor millwork securely.
- .5 Supply and install heavy duty fixture attachments for wall mounted cabinets.
- .6 Scribe and cut as required to fit abutting walls and to fit properly into recesses and to accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects.
- .7 Apply bituminous coating over wood framing members in contact with masonry or cementitious construction.
- .8 Fit hardware accurately and securely in accordance with manufacturer's written instructions.

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

3.03 FINISHING HARDWARE

- .1 Install hardware to standard hardware location dimensions in accordance with manufacturer's recommendations and to project design requirements.
- .2 Adjust cabinet hardware for optimum, smooth operating condition.
- .3 Lubricate hardware and other moving parts.
- .4 Adjust cabinet door hardware to ensure tight fit at contact points with frames.

3.04 PROTECTION

- .1 Protect millwork and cabinet work from damage until final inspection.
- .2 Protect installed products and components from damage during construction.
- .3 Repair damage to adjacent materials caused by architectural woodwork installation.

3.05 SCHEDULE OF ITEMS

- .1 Refer to drawings for details and further information.
- .2 Shelving:
 - .1 Install shelving on shelf brackets as indicated.
 - .2 Edge banding: provide 10 mm thick solid matching wood strip on plywood edges 12 mm or thicker, exposed in final assembly. Strips same width as plywood.
- .3 Casework:
 - .1 Core material: Composite wood products.
 - .2 Finish: Plastic laminate.

- .4 Plastic laminate finish:
 - .1 Make allowances around perimeter where fixed objects pass through or project into laminated plastic work to permit normal movement without restriction.
 - .2 Use draw bolts and splines in countertop joints. Maximum spacing 450 mm on centre, 75 mm from edge. Make flush hairline joints.
 - .3 Provide cutouts for inserts, grilles, appliances, outlet boxes and other penetrations. Round internal corners, chamfer edges and seal exposed core.
 - .4 At junction of laminated plastic counter back splash and adjacent wall finish, apply small bead of sealant.
- .5 Solid surfacing finish:
 - .1 Install countertops with no more than 3 mm sag, bow or other variation from a straight line.
 - .2 Work station counters to be laminated to two layers of 19 mm plywood with waterfall edge.
 - .3 Fabricate radius cove at intersection of counters with backsplashes to dimensions shown on reviewed Shop Drawings. Adhere to countertops using manufacturer's standard colour-coordinated joint adhesive.
 - .4 Keep components and hands clean during installation. Remove adhesives, sealants and other stains.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.

1.02 REFERENCES

- .1 ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- .2 ASTM C1320 - Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
- .3 CAN/ULC S701 - Standard for Thermal Insulation, Polystyrene Boards.
- .4 CAN/ULC S702 - Standard for Mineral Fibre Thermal Insulation for Buildings.
- .5 CAN/ULC S770 - Standard Test Method for Determination of Long-term Thermal Resistance of Closed-cell Thermal Insulating Foams.

1.03 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for thermal insulation including product characteristics, performance criteria, and limitations.
- .3 Reports/certificates: Submit the following:
 - .1 Submit certified test reports showing compliance with specified performance characteristics and physical properties.
 - .2 Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.04 QUALITY ASSURANCE

- .1 Installers: Perform Work of this Section by a company that has a minimum of five (5) years proven experience in the installation of thermal insulation of a similar size and nature.

2 PRODUCTS

2.01 BATT INSULATION

- .1 Non-rated batt Insulation:
 - .1 CAN/ULC S702; Friction fit batt insulation.
 - .2 Greenguard certified.
 - .3 Basis of Design:
 - .1 Unfaced Formaldehyde-Free Fibreglass Insulation by Johns Manville.
 - .2 Pink Next Gen Fiberglas Insulation by Owens Corning Canada.
 - .3 ComfortBatt by Rockwool
- .2 Fire-rated and sound-rated batt Insulation:
 - .1 ASTM C665; Paperless, semi-rigid spun mineral wool.
 - .2 Density: 40 kg/m³.
 - .3 Greenguard certified.
 - .4 Basis of Design:
 - .1 MinWool SAFB by Johns Manville.
 - .2 Thermafiber SAFB by Owens Corning Canada.
 - .3 Rockwool AFB by Rockwool

2.02 BOARD INSULATION

- .1 Foundation and below grade board Insulation:
 - .1 CAN/ULC S701, Type 4; Extruded polystyrene produced with reduced global warming potential (GWP).
 - .2 Compressive strength: Minimum 210 kPa.
 - .3 Long-Term Thermal Resistance (LTTR) to CAN/ULC S770: Minimum RSI 0.88.
 - .4 Basis of Design:
 - .1 Styrofoam SM30 by Dupont de Nemours Inc.
 - .2 Foamular NGX C-300 by Owens Corning Canada.
 - .3 Sopra-XPS 30 by Soprema.
- .2 High density underslab board Insulation:
 - .1 CAN/ULC S701, Type 4; Extruded polystyrene produced with reduced global warming potential (GWP).
 - .2 Compressive strength: 275 kPa.
 - .3 Long-Term Thermal Resistance (LTTR) to CAN/ULC S770: Minimum RSI 0.88.
 - .4 Basis of Design:
 - .1 Highload 40 by Dupont de Nemours Inc.
 - .2 Foamular NGX 400 by Owens Corning Canada.
 - .3 Sopra-XPS 40 by Soprema.

2.03 ACCESSORIES

- .1 Foundation insulation:
 - .1 Adhesive: As recommended by insulation manufacturer and approved by waterproofing manufacturer.
 - .2 Protection board: Minimum 2 mm (80 mils) thick:
 - .1 Basis of Design:
 - .1 990-31 by Henry Company Canada.
 - .2 Sopraboard by Soprema.
 - .3 Vibraflex PC by W.R. Meadows.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.02 INSTALLATION

- .1 Install insulation after building substrate materials are dry.
- .2 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .3 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.
- .4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from chimneys or vents.
- .5 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.
- .6 Offset both vertical and horizontal joints in multiple layer applications.
- .7 Do not enclose insulation until it has been inspected and approved by Consultant.

3.03 INSTALLATION SCHEDULE

- .1 Batt insulation:
 - .1 Install insulation to maintain continuity of thermal protection to building elements and spaces and to ASTM C1320.
 - .2 Do not compress insulation to fit into spaces.

- .3 Friction fit insulation in place with no voids.
- .2 Foundation insulation:
 - .1 Exterior application: extend boards 300 mm minimum below finish grade.
Install on exterior face of perimeter foundation wall with adhesive.
- .3 High density underslab insulation:
 - .1 Under slab application: provide insulation boards under slab as indicated.
Lay boards on level compacted fill.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.

1.02 REFERENCES

- .1 ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.
- .2 CAN/CGSB 51.34M - Vapor Barrier, Polyethylene Sheet for Use in Building Construction (Withdrawn).

1.03 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for vapour retarders including product characteristics, performance criteria, and limitations.
- .3 Reports/certificates: Submit the following:
 - .1 Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.04 QUALITY ASSURANCE

- .1 Installers: Perform Work of this Section by a company that has a minimum of five (5) years proven experience in the installation of vapour retarders of a similar size and nature.
- .2 Mock-ups:
 - .1 Construct one (1) mock-up of each type of vapour retarder in location as directed by Consultant.
 - .2 Mock-up shall be 5 m² and demonstrate one lap joint, one inside corner and one electrical box.
 - .3 Mock-up may form part of the Work if accepted by the Consultant.

1.05 SITE CONDITIONS

- .1 Work of this Section shall not be performed when air and surface temperatures are outside of manufacturers recommended ranges.

- .2 Do not perform work of this section during rain or inclement weather or on frost covered substrates or surfaces that are wet to the touch.

2 PRODUCTS

2.01 SHEET VAPOUR RETARDER

- .1 Poly sheet vapour retarder: Polyethylene film to CAN/CGSB 51.34, and providing the minimum values:
 - .1 Minimum thickness: 0.15 mm (6 mil).
 - .2 Water vapour permeance (ASTM E96): 1 perm or less.
- .2 Joint sealing tape: Air resistant pressure sensitive adhesive tape, type recommended by vapour barrier manufacturer in following widths:
 - .1 50 mm wide for lap joints and perimeter seals.
 - .2 25 mm wide elsewhere.
- .3 Sealant: Single component, non-skinning, non-hardening synthetic rubber sealant. Basis of Design:
 - .1 Acoustical/Curtainwall Sealant by Tremco.
 - .2 Or approved equal.
- .4 Moulded box vapour barrier: Factory-moulded polyethylene box for use with recessed electric switch and outlet device boxes.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.02 SHEET VAPOUR RETARDER INSTALLATION

- .1 Ensure services are installed and inspected prior to installation of sheet retarder.
- .2 Install sheet vapour retarder on warm side of exterior wall assemblies prior to installation of interior finishes to form continuous retarder.
- .3 Use sheets of largest practical size to minimize joints.
- .4 Cut sheet vapour retarder to form openings and ensure material is lapped and sealed to frame.

- .5 Seal perimeter of sheet vapour barrier as follows:
 - .1 Apply continuous bead of sealant to substrate at perimeter of sheets.
 - .2 Lap sheet over sealant and press into sealant bead.
 - .3 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.
- .6 Seal lap joints of sheet vapour barrier as follows:
 - .1 Attach first sheet to substrate.
 - .2 Apply continuous bead of sealant over solid backing at joint.
 - .3 Lap adjoining sheet minimum 150 mm and press into sealant bead.
 - .4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.
- .7 Seal electrical switch and outlet device boxes that penetrate vapour barrier as follows:
 - .1 Install moulded box vapour barrier or wrap boxes with film sheet providing minimum 300 mm perimeter lap flange.
 - .2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.
- .8 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.

1.02 REFERENCES

- .1 AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site.
- .2 AAMA 501.1 - Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure.
- .3 AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- .4 ANSI H35.1/H35.1M - American National Standard Alloy and Temper Designation Systems for Aluminum.
- .5 ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .6 ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- .7 ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants.
- .8 ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- .9 ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .10 ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
- .11 CSA G40.20/G40.21 - General requirements for rolled or welded structural quality steel / Structural quality steel.

1.03 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate installation of the work of this section with installers of wall mounted items, equipment, mechanical, and electrical work to ensure integrity of cladding system is not affected.
 - .1 Panel penetrations to be pre-approved by manufacturer prior to work starting.
 - .2 Coordinate interface, transition, lapping, flashings and compatibility of membranes with other trades.
- .2 Site Meetings: Arrange a pre-installation meeting on Site to be attended by Consultant, Contractor, panel manufacturer's representative, and any other parties directly affecting work of this Section to:
 - .1 Examine substrate conditions for compliance with manufacturer's requirements.
 - .2 Review methods and procedures related to installation.
 - .3 Review all typical and special details as required to complete the work of this section.

1.04 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for aluminum plate panels including product characteristics, performance criteria, and limitations.
- .3 Shop Drawings: Submit Shop Drawings as follows:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Shop Drawings to illustrate details, dimensions, fabrication and installation details.
 - .3 Clearly indicate finish, type and thicknesses of system components, size, spacing and location of support framing, sub-girts, penetrations, connections, types and locations of fastenings. Indicate provisions for structural and thermal movement between panel system and adjacent materials.
- .4 Samples: Submit samples illustrating colours, textures and finishes including, but not limited to:
 - .1 600 mm long support framing, trims and corner.
 - .2 300 mm x 300 mm panel complete with specified finish.
- .5 Reports/certificates: Submit the following:
 - .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.
- .3 Submit installers letter of certification from manufacturer.

1.05 CLOSEOUT AND MAINTENANCE SUBMITTALS

- .1 Submit closeout and maintenance submittals in accordance with Section 01 78 00.
- .2 Closeout Product data: Submit manufacturers maintenance and cleaning data for incorporation into operation and maintenance manual including product warranty documentation.

1.06 QUALITY ASSURANCE

- .1 Installers: Perform Work of this Section by a company that has a minimum of ten (10) years proven experience in the installation of aluminum plate panels of a similar size and nature. Installer to be trained and approved by panel manufacturer.
- .2 Mock-ups:
 - .1 Construct one (1) mock-up of each type of aluminum plate panel system in location as directed by Consultant.
 - .2 Mock-up shall be 5 m² and demonstrate use of all components including support system, fastenings, flashings and finishing details.
 - .3 Mock-up may form part of the Work if accepted by the Consultant.

1.07 DELIVERY, STORAGE, AND HANDLING

- .1 Conform to AAMA CW-10 for the care and handling of aluminum panels.
- .2 Handle panels in a manner to prevent scratching or breakage.
- .3 Store aluminum panels and support system materials in dry location. Aluminum panels shall be stored in an upright position. Panels stored in their vertical position shall be on their long side, and protected by means of wooden crating, cardboard or polystyrene.

1.08 WARRANTY

- .1 Provide extended warranty for aluminum plate panels in accordance with the General Conditions, except warranty is extended to five (5) years from date Ready-for-Takeover has been attained:
 - .1 Warranty to cover defects including staining, leaking, joint and finish failure.
 - .2 Warranty shall cover complete replacement of Work, including adjacent work impacted.

2 PRODUCTS

2.01 SYSTEMS AND MANUFACTURERS

- .1 Aluminum Plate by Kanalco Ltd.
- .2 Alumitex AFS by Ontario Panelization.
- .3 SL-2000P by Sobotec.

2.02 PERFORMANCE CRITERIA

- .1 Design aluminum plate panel system based on rainscreen principle and as a dry joint system. System shall conform to the following testing criteria:
 - .1 Air Infiltration: Air leakage through assembly of not more than 0.3 L/s per sq. m. of wall area when tested according to ASTM E283/E283M at a pressure difference of 75 Pa.
 - .2 Water Penetration under Static Pressure: No water penetration when tested according to ASTM E331 at a pressure difference of 300 Pa.
 - .3 Water Penetration under Dynamic Pressure: No water penetration when tested according to AAMA 501.1.
 - .4 Structural Performance: Metal wall panel assemblies shall withstand the effects of the following loads and stresses within limits and under conditions indicated, based on testing to ASTM E330/E330M:
 - .1 Wind Loads: Design wall system to resist wind loads, positive and negative, for location as indicated in National Building Code without causing rattling, vibration or excessive deflection of panels, overstressing of fasteners, clips or other detrimental effects on wall system.
 - .2 Deflection Limit: Panels must return to an essentially flat condition after design wind load is removed with permanent set not to exceed L/800.
- .2 Structural & Thermal Movements: Accommodate movement of building structure and movement caused by thermal expansion and contraction of system component parts without causing bowing, buckling, cracking, oil canning, failure of joint seals, excessive stress on fasteners or any other detrimental effects.
- .3 Design tolerance shall be as follows:
 - .1 Aluminum plate panels shall have even rises and falls across panel. Panels shall meet the following maximum tolerances:
 - .1 1.5 mm in convex direction, measured perpendicularly to normal plane.
 - .2 1.5 mm in concave direction, measured perpendicularly to normal plane.

- .2 Maximum deviation from vertical and horizontal alignment of erected panels: 6 mm in 6 m.
- .3 Maximum deviation from panel flatness shall be 3 mm in 1.5 m panel in any direction for assembled units (non-accumulative).
- .4 Design system to allow for removal of any individual panel within system.
- .5 Design panel joint system to ensure any components behind panel system are not visible.
- .6 Panel joint system to be free of extruded trim returning on the face of aluminum plate panel system.

2.03 MATERIALS

- .1 Aluminum plate:
 - .1 Plate: Aluminum alloy to ANSI H35.1/H35.1M, series 3003-H14 (Painted quality tensioned).
 - .2 Panel Thickness: 3.2 mm.
 - .3 Attachment clips: As provided by manufacturer for installation of panels to framing system.
 - .4 Aluminum infill strips: manufacturers matching strip.
- .2 Support system:
 - .1 Structural components: Provide framing, plates, and similar items conforming to CSA G40.20/G40.21.
 - .2 Adjustable angles, Z-bars and channel subgirts: to ASTM A653/A653M, Z275 galvanized steel, designed to accommodate expansion and contraction, dynamic movements and design load requirements.
- .3 Air/vapour retarders: Refer to Section 07 26 13.
- .4 Insulation: Refer to Section 07 21 00.
- .5 Flashings, trims and closures: Provide inside corners, outside corners, control joints, wall fixtures and termination trims in material and finish to match panels.
- .6 Sealing materials:
 - .1 Sealant: Single-component, moisture cure silicone sealant to ASTM C920, Type S, Grade NS.
 - .1 Dowsil 795 Silicone by Dow.
 - .2 Spectrum 1 by Tremco.
 - .3 Or approved equal.
 - .2 Joint backing: to ASTM C1330; Round, solid section, soft polyethylene foam gasket compatible with primer and sealant materials.
 - .3 Primer: As recommended by sealant manufacturer.

- .7 Fasteners: Concealed stainless steel fasteners as recommended by panel manufacturer. Size and spacing as recommended by manufacturer.

2.04 FABRICATION

- .1 Fabricate panels in controlled environment with all panel lines, breaks and angles sharp and true.
- .2 Fabricate all exposed edges, corners and ends with polished smooth, free from sharp edges or burrs.
- .3 Fabricate work to profiles and sizes as indicated on drawings and complete with trims, flashings and filler components as required to interface with work of other Sections. Confirm all dimensions on Site prior to fabrication.
- .4 Fabricate panels to allow for thermal and structural movements without deformation or damage to panels.
- .5 Confirm locations and sizes of all penetrations as required by other trades prior to submission of Shop Drawings. Reinforce penetrations over 300 mm x 300 mm.

2.05 FINISHES

- .1 Paint finishes: Three-coat fluoropolymer coating finish containing Kynar 500 resin conforming to AAMA 2605; PPG Duranar XL in colour to be selected by Consultant.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.02 PREPARATION

- .1 Provide isolation coating at all metal surfaces in contact with cementitious surfaces including concrete, and masonry. Provide isolation coating at aluminum to steel surfaces.

3.03 INSTALLATION

- .1 Install work of this Section in accordance with manufacturer's written instructions, plumb with intersecting parts joined together to provide accurately fitted joints with adjoining surfaces in true planes. Attach components in manner not restricting movement.
- .2 Support system:
 - .1 Install supporting framing required to support work of this section.
 - .2 Mechanically fasten sub-girts to substrate.
- .3 Air/vapour retarders: Installed in accordance with Section 07 26 13.
- .4 Insulation: Installed in accordance with Section 07 21 00.
- .5 Flashings, trims and closures:
 - .1 Supply and install all closures, caps, fascia covers, flashings and trims.
 - .2 Provide required metal flashings around penetrations through metal panels. Ensure complete watertight seal.
- .6 Aluminum plate panels:
 - .1 Erect panels in accordance with system manufacturer's details and instructions and so as to meet specified design and performance requirements.
 - .2 Finished work shall be securely anchored, free of distortion and surface imperfections, uniform in colour and gloss.
 - .3 Install panels plumb, true, level and in alignment to established lines and elevations.
 - .4 Ensure drainage of any moisture which may occur within system to exterior.
 - .5 Damaged panels, waviness, warp or distortion of finished work will not be accepted.
 - .6 Completed installation shall be free from rattles, wind whistles, noise due to thermal movement and other noises.
- .7 Sealing materials:
 - .1 Prepare substrate surface, mask, and prime as recommended by sealant manufacturer.
 - .2 Install joint backing and sealant at perimeter of aluminum panel system and where indicated on drawings for weathertight installation. Tool sealant to concave profile.
 - .3 Seal around all openings and penetrations to provide weathertight and watertight seal.
- .8 Installation tolerances:
 - .1 Variation in Line Over Entire Area: For positions shown in plan and continuous lines, do not exceed 1:500 or 15 mm, whichever is less.

- .2 Variation in Plumb Over Entire Area: Vertical lines, external corners and other vertical conspicuous lines, do not exceed 1:500.
- .3 Variation in Level, Panel to Panel: Horizontal bands, horizontal grooves, and other horizontal conspicuous lines, do not exceed 1:500.
- .4 Variation in Panel Joint Width: Do not exceed 3 mm.
- .5 Variation in Plane Between Adjacent Panels (Lipping or Step-in-Face): Do not exceed 1 mm difference between planes of adjacent panels.
- .6 Jog in Alignment of Edge of Adjacent Panels: Do not exceed 1 mm.

3.04 CLEANING

- .1 Clean exposed panel surfaces in accordance with manufacturer's instructions.
- .2 Repair and touch up with colour matching minor surface damage, only where permitted by the Consultant and only where appearance after touch-up is acceptable to Consultant.
- .3 Replace damaged panels and components that, in opinion of the Consultant, cannot be satisfactorily repaired.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.

1.02 REFERENCES

- .1 ASTM D2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
- .2 ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
- .3 ASTM D4060 - Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.
- .4 ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- .5 ASTM E736/E736M - Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members.
- .6 ASTM E2924 - Standard Practice for Intumescent Coatings.
- .7 Association of the Wall and Ceiling Industry (AWCI) - Technical Manual 12-B; Standard Practice for the Testing and Inspection of Field-Applied Thin-Film Intumescent Fire-Resistive Materials.
- .8 CAN/ULC S101 - Standard Methods of Fire Endurance Tests of Building Construction and Materials.
- .9 CAN/ULC S102 - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.03 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
 - .1 Coordinate with structural steel Section for steel surfaces to meet manufacturer's minimum surface preparation requirements for bond surface that is free from wax, grease or other deleterious material that could affect bond of materials specified in this Section.
 - .2 Coordinate with structural steel Section to ensure steel primer is compatible with site-applied intumescent coatings and approved by intumescent manufacturer.

- .3 Coordinate installation of hangers, inserts, clips and similar items to surfaces needing protection before applying intumescent fire protection materials.
- .4 Coordinate installation of ducts, pipes, conduits, suspended equipment, and similar items that could obstruct spraying operations before applying intumescent fire protection materials.
- .2 Site Meetings: Arrange a pre-installation meeting on Site to be attended by Consultant, Contractor, intumescent fire protection manufacturer's representative, and any other parties directly affecting work of this Section to:
 - .1 Examine substrate conditions for compliance with manufacturer's requirements.
 - .2 Verify Project requirements.
 - .3 Co-ordination with other building sub-trades.
 - .4 Review methods and procedures related to installation.
 - .5 Review all typical and special details as required to complete the work of this section.

1.04 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for intumescent fire protection including product characteristics, performance criteria, and limitations.
- .3 Samples: Submit 300 mm x 300 mm samples illustrating colours, and textures of fire protection material.
- .4 Reports/certificates: Submit the following:
 - .1 Submit product data including certified copies of test reports verifying intumescent fire protection applied to substrate as constructed on project will meet or exceed requirements of Specification.
 - .2 Submit test results in accordance with CAN/ULC S101 for fire endurance and CAN/ULC S102 for surface burning characteristics.
 - .3 Submit proposals for assemblies not tested and rated based on related designs using accepted fireproofing design criteria with engineering judgement and acceptance of authorities having jurisdiction.
 - .4 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .5 Submit manufacturers field reports within 3 days of review.

1.05 QUALITY ASSURANCE

- .1 Installers: Perform Work of this Section by a company that has a minimum of five (5) years proven experience in the installation of intumescent fire protection systems of a similar size and nature.

- .2 Manufacturer's Site inspections: Schedule site visits to review Work at the following stages:
 - .1 After delivery and storage of products, and when preparatory Work is complete but before installation begins.
 - .2 Twice during progress of Work at 25% and 60% complete.
 - .3 Upon completion of Work, after cleaning is carried out.

1.06 DELIVERY, STORAGE, AND HANDLING

- .1 Store materials in dry location.
- .2 Store and protect materials from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.
- .3 Damaged or opened containers will be rejected.
- .4 Packaging to indicate shelf-life and materials to be applied prior to expiration of shelf-life.

1.07 SITE CONDITIONS

- .1 Ambient Conditions: Work of this Section shall be performed when air and surface temperatures are minimum 5 degree C, and ensuring that 5 degree C air and substrate temperature is maintained during and for 24 hours after application.
- .2 Maintain relative humidity within limits recommended fireproofing manufacturer.
- .3 Ensure that natural ventilation to properly dry fireproofing during and subsequent to its application is provided.
- .4 In enclosed areas lacking openings for natural ventilation, provide minimum of 4 air exchanges per hour by forced air circulation.

2 PRODUCTS

2.01 PERFORMANCE CRITERIA

- .1 Adhesion: Provide materials that meet or exceed adhesion requirements in accordance with ASTM E736/E736M.
- .2 Thickness and Density: Determine application thickness and weight of applied fireproofing based on tests of assemblies in accordance with CAN/ULC S101.

- .3 Engineered Judgements: If material being protected differs from tested conditions used to determine intumescent thickness, provide engineered judgement acceptable to authorities having jurisdiction.

2.02 MATERIALS

- .1 Interior Intumescent Fire Protection for Steel: ULC certified, single-component, water-based, factory-mixed, asbestos-free, thin film intumescent material qualified for use in ULC Designs and fire-resistance rating times as indicated on Drawings, and as follows:
 - .1 Bond Strength: To ASTM D4541, minimum 3.3 Mpa.
 - .2 Abrasion Resistance: To ASTM D4060, maximum 103 mg loss at 1000 cycles.
 - .3 Impact Resistance: To ASTM D2794, minimum 1.75 kg/m.
 - .4 Surface Burning Characteristics, to ASTM E84, Class A.
 - .5 Compressive Strength: Minimum 5.2 MPa.
 - .6 Surface Texture: Smooth.
 - .7 Basis of Design:
 - .1 A/D Firefilm III by Carboline Coatings.
 - .2 Cafco Sprayfilm WB3 by Isolatek International.
 - .3 Or approved equal.
- .2 Primer and topcoat: Type recommended or approved by fireproofing manufacturer. Colour: To be selected by Consultant.
- .3 Water: Clean, fresh, suitable for domestic consumption, and free from amounts of mineral or organic substance that would affect setting of fire resistant material.

2.03 MIXES

- .1 Mix intumescent fire protection material in accordance with manufacturers written instructions.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.
- .2 Ensure that substrates are free of material which would impair bond.
- .3 Verify that painted substrates are compatible and have suitable bonding characteristics to receive intumescent fire protection.

- .4 Ensure that items required to penetrate intumescent fire protection are placed before installation of coating.
- .5 Ensure that ducts, piping, equipment, or other items which would interfere with application of intumescent fire protection are not positioned until fire protection work is completed.

3.02 PREPARATION

- .1 Mask all work subjected to potential overspray during application. Provide temporary enclosure when necessary to temporarily confine intumescent fire protection and protect environment.
- .2 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of fire protection materials.
- .3 Ensure written confirmation is received from steel fabricators of specific surface preparation procedures and primers used for application of intumescent fire protection materials to ascertain compatibility with work of this Section:
 - .1 Work in accordance with SSPC guidelines SSPC-SP-1 , SSPC-SP-2 , SSPC-SP-3 , or SSPC-SP-6/NACE No.3 as appropriate to prepare substrate.
- .4 Apply primer to substrate as recommended by manufacturer.

3.03 APPLICATION

- .1 Apply intumescent fire protection to correspond with tested assemblies, or acceptable calculation procedures to provide fire resistance ratings indicated on drawings.
- .2 Apply fireproofing over substrate, building up to required thickness to cover substrate with monolithic blanket of uniform density and texture.
- .3 Apply materials to substrates using manufacturer's recommended equipment, in accordance with manufacturer's instructions, ULC Design numbers, and ASTM E2924.
- .4 Provide primer "cut-back" 75 mm for steel bolted connections and 305 mm for welded connections.
- .5 Apply topcoat material to surface of intumescent fire protection as required by manufacturer.

3.04 PATCHING

- .1 Cut, patch, and repair materials which fail to meet requirements of this Section or which fail to attain properties stipulated in test reports used to determine fire-resistance rating of assembly.
- .2 Repair damage to fire-resistant material caused by other Subcontractors.
- .3 Repair damage to fire protection caused by testing or by other Subcontractors before fire protection is concealed, or if exposed, before final inspection.

3.05 SITE QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's field reports.
- .2 Inspection and Site Tests:
 - .1 Inspection and testing of intumescent fire protection will be carried out by Testing Laboratory designated by Consultant.
 - .2 Testing to meet the requirements of the authorities having jurisdiction.
 - .3 Tests to be performed in accordance with ASTM E2924, and Technical Manual 12-B by AWCI.

3.06 CLEANING

- .1 Clean surfaces not indicated to receive intumescent fire protection of sprayed material within 24 hours period after application.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.

1.02 DEFINITIONS

- .1 Fire Stop Material: Device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.
- .2 Single Component Fire Stop System: Fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.
- .3 Multiple Component Fire Stop System: Exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.
- .4 Continuity of Fire Separations: Wall, partition or floor assemblies required to be a fire separation shall be:
 - .1 Constructed as a continuous element;
 - .2 Have a fire resistance rating;
 - .3 Have openings protected by a closure; and
 - .4 Have penetrations sealed by a firestop.

1.03 REFERENCES

- .1 ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestop Systems.
- .2 CAN/ULC S101 - Standard Methods of Fire Endurance Tests of Building Construction and Materials.
- .3 CAN/ULC S102 - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .4 CAN/ULC S115 - Standard Method of Fire Tests of Firestop Systems.

1.04 ADMINISTRATIVE REQUIREMENTS

- .1 Site Meetings: Arrange a pre-installation meeting on Site to be attended by Consultant, Contractor, firestopping and smoke seal manufacturer's representative, and any other parties directly affecting work of this Section to:
 - .1 Examine substrate conditions for compliance with manufacturer's requirements.
 - .2 Verify Project requirements.
 - .3 Co-ordination with other building sub-trades.
 - .4 Review methods and procedures related to installation.
 - .5 Review all typical and special details as required to complete the work of this section.

1.05 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for firestopping and smoke seals including product characteristics, performance criteria, and limitations.
- .3 Shop Drawings: Submit Shop Drawings as follows:
 - .1 Shop Drawings to illustrate details, dimensions, and installation details.
 - .2 Indicate location, proposed material, reinforcement, anchorage, and fastenings.
 - .3 Ensure construction details accurately reflect actual job conditions.
- .4 Samples: Submit 300 mm x 300 mm samples illustrating actual firestop and smoke seal materials proposed for project.
- .5 Reports/certificates: Submit the following:
 - .1 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied firestopping and smoke seals 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 Submit manufacturers field reports within 3 days of review.

1.06 QUALITY ASSURANCE

- .1 Installers: Perform Work of this Section by a company that has a minimum of five (5) years proven experience in the installation of firestopping and smoke seal systems of a similar size and nature.

- .2 Manufacturer's Site inspections: Schedule site visits to review Work at the following stages:
 - .1 After delivery and storage of products, and when preparatory Work is complete but before installation begins.
 - .2 Twice during progress of Work at 25% and 60% complete.
 - .3 Upon completion of Work, after cleaning is carried out.

1.07 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver materials to Site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, and ULC markings.
- .2 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

2 PRODUCTS

2.01 MANUFACTURERS

- .1 3M.
- .2 Hilti Canada Corporation.
- .3 STI Specified Technologies Inc.
- .4 Tremco Canada Ltd.

2.02 PERFORMANCE CRITERIA

- .1 Materials to have been tested in accordance with CAN/ULC S101 for fire endurance and CAN/ULC S102 for surface burning characteristics.

2.03 MATERIALS

- .1 General:
 - .1 All firestopping and smoke seal material shall be from one manufacturer.
 - .2 All firestopping and smoke seal installation work for entire project shall be by a single contractor experienced in firestopping and smoke seal installations.
- .2 Firestopping and smoke seal systems: in accordance with CAN/ULC S115 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 and not to exceed opening sizes for which they are intended.

- .2 Fire stop system rating: Systems shall achieve fire resistance rating and smoke seal rating equal to that of assemblies into which they are installed.
- .3 Provide systems consisting of ULC or Intertek Testing Services listed Products and systems.
- .4 Firestop applications for which no ULC or cUL tested system is available will require a manufacturer's engineering judgment follow requirements set forth by the International Firestop Council. Engineering judgement will be submitted to local authorities having jurisdiction for their review and approval prior to installation and will be derived from similar ULC or cUL system designs.
- .3 Service penetration assemblies: Systems tested to CAN/ULC S115.
- .4 Service penetration fire stop components: certified by test laboratory to CAN/ULC S115.
- .5 Fire-resistance rating of installed firestopping assembly in accordance with 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 Primers: to manufacturer's recommendation for specific material, substrate, and end use.
- .9 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
- .10 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.
- .11 Sealants for vertical joints: non-sagging.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.02 PREPARATION

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.
- .2 Ensure that substrates and surfaces are clean, dry and frost free.
- .3 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
- .4 Maintain insulation around pipes and ducts penetrating fire separation.
- .5 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.03 INSTALLATION

- .1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.
- .2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.
- .3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .4 Tool or trowel exposed surfaces to neat finish.
- .5 Remove excess compound promptly as work progresses and upon completion.
- .6 Sequences of Operation:
 - .1 Proceed with installation only when submittals have been reviewed by Consultant.
 - .2 Install floor fire stopping before interior partition erections.
 - .3 Metal deck bonding: Firestopping to precede spray applied fireproofing to ensure required bonding.
 - .4 Mechanical pipe insulation: Certified fire stop system component. Ensure pipe insulation installation precedes firestopping.

3.04 SITE QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's field reports.

- .2 Inspection and Site Tests:
 - .1 Inspection and testing of firestopping and smoke seals will be carried out by Testing Laboratory designated by Consultant.
 - .2 Testing to meet the requirements of the authorities having jurisdiction.
 - .3 Tests to be performed in accordance with ASTM E2174.

3.05 CLEANING

- .1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Remove temporary dams after initial set of firestopping and smoke seal materials.

3.06 SCHEDULE

- .1 Generally allow for firestopping and smoke seals at the following locations. The following list has been provided for convenience and is not to be assumed to be complete. Review Contract Documents to determine the full extent of the Work of this Section and to satisfy the requirements of [Ontario Building Code](#):
 - .1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.
 - .2 Edge of floor slabs at curtain wall and precast concrete panels.
 - .3 Top of fire-resistance rated masonry and gypsum board partitions.
 - .4 Intersection of fire-resistance rated masonry and gypsum board partitions.
 - .5 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.
 - .6 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.
 - .7 Openings and sleeves installed for future use through fire separations.
 - .8 Around mechanical and electrical assemblies penetrating fire separations.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.

1.02 REFERENCES

- .1 ASTM C834 - Standard Specification for Latex Sealants.
- .2 ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- .3 ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants.

1.03 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for joint sealant including product characteristics, performance criteria, compatibility and limitations.
- .3 Samples: Submit 300 mm x 300 mm samples illustrating materials and colours, of each type and colour required for Work.

1.04 QUALITY ASSURANCE

- .1 Installers: Perform Work of this Section by a company that has a minimum of five (5) years proven experience in the installation of joint sealants of a similar size and nature.

1.05 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

1.06 SITE CONDITIONS

- .1 Ambient Conditions: Work of this Section shall be performed when air and surface temperatures are above 5 degree C.
- .2 Do not proceed with installation of joint sealants when joint substrates are wet.

- .3 Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- .4 Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

2 PRODUCTS

2.01 MATERIALS

- .1 General:
 - .1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.
 - .2 When low toxicity caulks are not possible, confine usage to areas which offgas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize offgas time.
 - .3 Use sealants of same manufacturer within each similar construction area.
 - .4 Where sealants are qualified with primers use only these primers.
 - .5 Colours of sealants to be selected by Consultant from manufacturers standard colour range.
- .2 Sealant (Type 1):
 - .1 Single-component, medium modulus, neutral cure, silicone sealant.
 - .2 Sealant properties: to ASTM C920, Type S, Grade NS.
 - .3 Basis of Design:
 - .1 Dowsil CWS by Dow.
 - .2 Sikasil WS-305 CN by Sika Canada.
 - .3 Tremsil 400 by Tremco.
 - .4 Or approved equal.
- .3 Sealant (Type 2):
 - .1 Single-component, non-staining, paintable, fast setting, acrylic latex sealant.
 - .2 Sealant properties: to ASTM C834, Type OP, Grade 18C.
 - .3 Basis of Design:
 - .1 Tremflex 834 by Tremco.
 - .2 Or approved equal.
- .4 Sealant (Type 3):
 - .1 Single-component, mildew-resistant, silicone rubber sealant.
 - .2 Sealant properties: to ASTM C920, Type S, Grade NS.
 - .3 Basis of Design:
 - .1 Dowsil 786 Silicone Sealant by Dow.
 - .2 Sikasil GP by Sika Canada.
 - .3 Tremsil 200 by Tremco.

- .4 Or approved equal.
- .5 Sealant (Type 4):
 - .1 Single-component, neutral cure, silicone sealant.
 - .2 Sealant properties: to ASTM C920, Type S, Grade NS, Class 50.
 - .3 Basis of Design:
 - .1 Dowsil 795 Silicone Building Sealant by Dow.
 - .2 Sikasil WS-295 by Sika Canada.
 - .3 Spectrum 2 by Tremco.
 - .4 Or approved equal.
- .6 Sealant (Type 5):
 - .1 Single component, non-skinning, non-hardening, sound damping synthetic rubber sealant.
 - .2 Basis of Design:
 - .1 Acoustical/Curtainwall Sealant by Tremco.
 - .2 Or approved equal.
- .7 Sealant (Type 6):
 - .1 Single-component, neutral cure, no-bleed silicone sealant.
 - .2 Sealant properties: to ASTM C920, Type S, Grade NS.
 - .3 Basis of Design:
 - .1 Dowsil 791 Weatherproofing Sealant by Dow.
 - .2 Sikasil WS-290 by Sika Canada.
 - .3 Spectrum 3 by Tremco.
 - .4 Or approved equal.

2.02 ACCESSORIES

- .1 Primer: As recommended by sealant manufacturer.
- .2 Joint backing: to ASTM C1330; Round, solid section, soft polyethylene foam gasket compatible with primer and sealant materials.
- .3 Bond breaker: Polyethylene bond breaker tape which will not bond to sealant.
- .4 Joint cleaner: Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

2.03 MIXING

- .1 Mix materials in strict accordance with sealant manufacturer's instructions.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.02 PREPARATION

- .1 Protect installed Work of other trades from staining or contamination.
- .2 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .3 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.
- .4 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.
- .5 Ensure joint surfaces are dry and frost free.
- .6 Prepare surfaces in accordance with manufacturer's directions.
- .7 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.
- .8 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.

3.03 APPLICATION

- .1 Apply sealant in accordance with manufacturer's written instructions.
- .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
- .3 Apply sealant in continuous beads.

- .4 Apply sealant using gun with proper size nozzle.
- .5 Use sufficient pressure to fill voids and joints solid.
- .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
- .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
- .8 Remove excess compound promptly as work progresses and upon completion.
- .9 Curing:
 - .1 Cure sealants in accordance with sealant manufacturer's instructions.
 - .2 Do not cover up sealants until proper curing has taken place.

3.04 CLEANING

- .1 Clean adjacent surfaces immediately and leave Work neat and clean.
- .2 Remove excess and droppings, using recommended cleaners as work progresses.
- .3 Remove masking tape after initial set of sealant.

3.05 SCHEDULE

- .1 The following list has been provided for convenience and is not to be assumed to be complete. Review Contract Documents to determine the full extent of the Work of this Section.
- .2 Generally seal the following:
 - .1 Concrete, masonry, wood and stone to metal.
 - .2 Wood to masonry, concrete and stone.
 - .3 Metal to metal.
 - .4 All dissimilar materials.
- .3 Sealant Type 1:
 - .1 Interior joints between dissimilar materials.
 - .2 Interior joints at perimeter of all built-in equipment.
 - .3 Interior joints at perimeter of metal door and window frames.
- .4 Sealant Type 2:
 - .1 Interior non-movement joints 6 mm or less for painting.
- .5 Sealant Type 3:
 - .1 Interior joints where mildew resistance is required.
 - .2 Interior joints at perimeter of all plumbing fixtures.

- .3 Interior joints between counter backsplash and wall surfaces.
- .4 Interior tile work.
- .6 Sealant Type 4:
 - .1 Glass to glass joints.
 - .2 Glass to metal joints.
 - .3 Metal to metal curtain wall joints.
 - .4 Interior face of metal panel joints.
- .7 Sealant Type 5:
 - .1 Perimeter of all gypsum board partitions where sound insulation is indicated.
 - .2 Acoustical joints at curtainwalls, and corridors.
- .8 Sealant Type 6:
 - .1 Exterior joints between dissimilar building veneer materials.
 - .2 Exterior control joints in building veneers.
 - .3 Exterior joints at perimeter of all door and window frames.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.

1.02 REFERENCES

- .1 ASTM A653/A653M - Specification for Steel Sheet, Zinc-coated Galvanized or Zinc-iron Alloy-coated Galvannealed by the Hot-dip Process.
- .2 CSA G40.20/G40.21 - General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel.
- .3 CSA W59 - Welded Steel Construction.
- .4 Canadian Steel Doors Manufacturers Association (CSDMA) - Recommended Specifications for Commercial Steel Door and Frame Products.
- .5 Canadian Steel Doors Manufacturers Association (CSDMA) - Installation and Storage of Hollow Metal Doors and Frames.
- .6 CAN/ULC S702 - Standard for Mineral Fibre Thermal Insulation for Buildings.
- .7 UL 752 - Standard for Bullet-Resisting Equipment.

1.03 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for metal doors and frames including product characteristics, performance criteria, and limitations.
- .3 Shop Drawings: Submit Shop Drawings as follows:
 - .1 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed components, arrangement of hardware and finishes.
 - .2 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings, and finishes.
 - .3 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.
- .4 Samples: Submit 300 mm x 300 mm corner samples of each type frame illustrating cutouts, glazing stops, connections and trims.

- .5 Reports/certificates: Submit the following:
 - .1 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
 - .2 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.04 QUALITY ASSURANCE

- .1 Manufacturers: Manufacturers to be a member in good standing of Canadian Steel Doors Manufacturers Association (CSDMA).

1.05 DELIVERY, STORAGE, AND HANDLING

- .1 Store metal doors and frames to the requirements outlined in the CSDMA Guide Specification for receiving and storage of doors.

2 PRODUCTS

2.01 MANUFACTURERS

- .1 Daybar Industries Limited.
- .2 Fleming Doors Products (Assa Abloy).
- .3 Vision Hollow Metal Limited.
- .4 Or approved equal.

2.02 PERFORMANCE CRITERIA

- .1 Design metal doors and frames noted as having a ballistic requirements to Class 3 in accordance with UL 752.

2.03 MATERIALS

- .1 Hot dipped galvanized steel sheet: to ASTM A653/A653M, ZF120, minimum base steel thickness in accordance with CSDMA Specification, Table 1, Minimum Steel Gauges for Component Parts. Steel to have minimum 30% recycled content.
- .2 Reinforcement channel: to CSA G40.20/G40.21, Type 44W, coating designation to ASTM A653/A653M, ZF120, minimum 30% recycled content.

- .3 Door Core Materials:
 - .1 Honeycomb construction (typical interior door): Structural small cell, 25.4 mm maximum kraft paper 'honeycomb', weight: 36.3 kg per ream minimum, density: 16.5 kg/m³ minimum, sanded to required thickness.
 - .2 Steel Stiffened (high use/traffic doors): Steel channels running vertically from top to bottom, spaced 150 mm o.c. and spot welded in place. Fill voids between stiffeners with mineral core as follows:
 - .1 Mineral Core: Mineral fibre to CAN/ULC S702, Type 1A, semi-rigid with 24 kg/m³ minimum density.
- .4 Adhesives:
 - .1 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.
 - .2 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, sealant/adhesive.
- .5 Zinc-rich primer:
 - .1 Carbozinc 11WB by Carboline.
 - .2 Dimetcote 9H by PPG.
 - .3 Zinc Clad XL by Sherwin Williams.
- .6 Door silencers: single stud rubber/neoprene type.
- .7 Glazing stops: Formed channel, minimum 16 mm high, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.
- .8 Glass and glazing materials: Refer to Section 08 81 00.
- .9 Metallic paste filler: to manufacturer's standard.

2.04 FRAME FABRICATION

- .1 Fabricate frames including steel frames, transom panels, sidelights and windows in accordance with CSDMA specifications.
- .2 Fabricate frames to profiles and maximum face sizes as indicated.
- .3 Fabricate frames of the following construction unless specifically noted otherwise:
 - .1 Interior frames: 1.2 mm welded type construction.
- .4 Blank, reinforce, drill and tap frames for mortised, templated hardware, and electronic hardware using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.

- .5 Protect mortised cutouts with steel guard boxes.
- .6 Prepare frame for door silencers, 3 for single door, 2 at head for double door.
- .7 Manufacturer's nameplates on frames and screens are not permitted.
- .8 Conceal fastenings except where exposed fastenings are indicated.
- .9 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
- .10 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 two anchors for rebate opening heights up to 1520 mm and one 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 jambs and intermediate at 660 mm on centre maximum.
- .11 Welded Frames:
 - .1 Welding in accordance with CSA W59.
 - .2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.
 - .3 Cope accurately and securely weld butt joints of mullions, transom bars, centre rails and sills.
 - .4 Grind welded joints and corners to flat plane, fill with metallic paste and sand to uniform smooth finish.
 - .5 Securely attach floor anchors to inside of each jamb profile.
 - .6 Weld in two temporary jamb spreaders per frame to maintain proper alignment during shipment.

2.05 DOOR FABRICATION

- .1 Doors: swing type, flush, with provision for glass and/or louvre openings as indicated.
- .2 Fabricate doors of the following construction unless specifically noted otherwise:
 - .1 Interior doors: laminated core and welded stiffener construction.
- .3 Fabricate doors with longitudinal edges tack welded at top and bottom of door, above and below each edge cutout and at 150 mm on center, filled and sanded. Seams: Grind welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish.

- .4 Blank, reinforce, drill doors and tap for mortised, templated hardware and electronic hardware.
- .5 Factory prepare holes 12.7 mm diameter and larger except mounting and through-bolt holes, which shall be completed on-site at time of hardware installation. Holes less than 12.7 mm diameter shall be factory prepared when required for function of device (knob, lever, cylinder, thumb or turn pieces) or when these holes over-lap function holes.
- .6 Reinforce doors where required, for surface mounted hardware. Provide inverted, recessed, spot welded channels to top and bottom of doors.
- .7 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.
- .8 Manufacturer's nameplates on doors are not permitted.
- .9 Laminated Core Construction:
 - .1 Form face sheets for interior doors from 1.2 mm sheet steel with honeycomb core laminated under pressure to face sheets.
- .10 Hollow Steel Vertically Stiffener Construction:
 - .1 Form face sheets for interior doors from 1.2 mm sheet steel.
 - .2 Laminated vertically stiffened doors:
 - .1 Vertical steel stiffeners shall be securely laminated to each face sheet at 150 mm on center maximum.
 - .2 Voids between vertical stiffeners shall be filled with mineral core.

2.06 FINISHES

- .1 Field paint steel doors and frames in accordance with Section 09 91 00.
- .2 Protect weatherstrips from paint.
- .3 Provide final finish free of scratches or other blemishes.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.
- .2 Check all door and frame products for correct size, swing, rating and opening number.

3.02 PREPARATION

- .1 Remove temporary shipping spreaders.
- .2 Check area of floor on which frames are to be installed, and within path of door swing for flatness. Report defects or unsatisfactory conditions to Consultant.

3.03 INSTALLATION

- .1 Install doors and frames to CSDMA Installation Guide, reviewed Shop Drawings, and manufacturer's written instructions.
- .2 Install doors and hardware in accordance with hardware templates, manufacturer's instructions, and Section 08 71 00.
- .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.
- .4 Door Installation:
 - .1 Adjust operable parts for correct function.
- .5 Install glazing for doors and frames in accordance with Section 08 81 00.

3.04 REPAIRS

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

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.

1.02 REFERENCES

- .1 AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- .2 ASTM A167 - Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .3 ASTM B209 - Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
- .4 ASTM B221 - Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
- .5 ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- .6 ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants.
- .7 ASTM E283 - Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- .8 ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls, by Uniform Static Air Pressure Difference.
- .9 ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform Static Air Pressure Difference.
- .10 ASTM F1233 - Standard Test Method for Security Glazing Materials and Systems.
- .11 CAN/CSA W59 - Welded Aluminum Construction.
- .12 ULC S710.1 - Standard for Bead-applied One Component Polyurethane Air Sealant Foam, Part 1: Material Specification.

1.03 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Co-ordinate work of this Section with installation of air and vapour retarders, flashing placement, and components or materials.

1.04 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for aluminum doors including anchorage and fasteners, glass and infill, internal drainage details and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings: Submit Shop Drawings as follows:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Shop Drawings to illustrate details, dimensions, fabrication and installation details.
 - .3 Indicate each type of door, material, thicknesses, mortises, reinforcements, location of openings, glazing, arrangement of hardware.
 - .4 Indicate each type frame, material, thickness, reinforcements, glazing stops, anchorages and exposed fastenings.
 - .5 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.
- .4 Samples: Submit 300 mm x 300 mm samples illustrating colours, textures and finishes including, but not limited to:
 - .1 Prefinished aluminum surface, finish, colour, and texture.
 - .2 One door section showing corner detail, glazing and butt reinforcement.
 - .3 One corner sample of door frame.
- .5 Reports/certificates: Submit the following:
 - .1 Test Reports: Submit substantiating engineering data, test results of previous tests by independent laboratory which purport to meet performance criteria, and supportive data.

1.05 CLOSEOUT AND MAINTENANCE SUBMITTALS

- .1 Submit closeout and maintenance submittals in accordance with Section 01 78 00.
- .2 Closeout Product data: Submit manufacturers maintenance and cleaning data for incorporation into operation and maintenance manual including product warranty documentation.

1.06 QUALITY ASSURANCE

- .1 Manufacturers: Company specializing in manufacturing the products specified in this section with minimum 5 years experience.
- .2 Installers: Perform Work of this Section by a company that has a minimum of five (5) years proven experience in the installation of aluminum doors of a similar size and nature.

1.07 DELIVERY, STORAGE, AND HANDLING

- .1 Handle work of this Section in accordance with AAMA CW-10.
- .2 Store and protect aluminum doors from nicks, scratches, and blemishes.
- .3 Protect prefinished aluminum surfaces with wrapping or strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1.08 SITE CONDITIONS

- .1 Ambient Conditions: Install sealants when ambient and surface temperature is above 5 degrees C minimum. Maintain this minimum temperature during and for 48 hours minimum after installation of sealants.

1.09 WARRANTY

- .1 Provide extended warranty for aluminum doors in accordance with the General Conditions, except warranty is extended to five (5) years from date Ready-for-Takeover has been attained:
 - .1 Warranty to cover defects including sealant failure, leakage, frame condensation and finish failure.
 - .2 Warranty shall cover complete replacement of Work, including adjacent work impacted.
- .2 Refer to Section 08 81 00 for insulated glass unit warranty.

2 PRODUCTS

2.01 SYSTEMS AND MANUFACTURERS

- .1 Entrances and Doors: Thermally broken aluminum doors with glazing, factory fabricated and finished.
 - .1 Profile: Minimum 63.5 mm.
 - .2 Basis of Design:
 - .1 ArmorDefend Plus Storefront by Oldcastle Building Envelope.

.2 Or approved equal.

2.02 PERFORMANCE CRITERIA

- .1 Design aluminum entrances and doors to resist loads and climatic data for the Place of the Work, and to follow rainscreen principles.
- .2 Design and size aluminum entrances and doors to withstand dead and live loads caused by pressure and suction of wind, acting normal to plane of wall using design pressure to ASTM E330 and as outlined below:
 - .1 Design aluminum for expansion and contraction caused by cycling temperature range of 95 degrees C over 12 hour period without causing detrimental effect to components.
 - .2 Thermal expansion: Ensure aluminum can withstand temperature differential of 85 degrees C and is able to accommodate interior and exterior expansion and contraction without damage to components or deterioration of seals.
 - .3 Air infiltration: 0.3 L/s/m² maximum of wall area to ASTM E283 at differential pressure across assembly of 300 Pa.
 - .4 Water infiltration: None to ASTM E331 at differential pressure across assembly of 720 Pa.
- .3 Design aluminum entrances and doors to meet security requirements of ASTM F1233, Class 1.4 HG3 (9 mm handgun).

2.03 MATERIALS

- .1 Extruded aluminum: To ASTM B221, 6063 alloy with T6 temper.
- .2 Sheet aluminum: To ASTM B209, utility grade for unexposed surfaces.
- .3 Steel sections: to ASTM A167 Type 304 stainless; shaped to suit mullion sections.
- .4 Glass and glazing: In accordance with Section 08 81 00.
- .5 Thermal Break: Glass fibre reinforced polyamide porthole extrusion.
- .6 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.
- .7 Fasteners, screws and bolts: Tamperproof, cadmium plated stainless steel 300 series to meet aluminum door requirements and as recommended by manufacturer.
- .8 Anchors: Extruded aluminum or stainless steel with three-way adjustment.

- .9 Sealant Materials:
 - .1 Sealant:
 - .1 Single-component, neutral cure, silicone sealant conforming to ASTM C920, Type S, Grade NS, Class 50.
 - .2 Verify compatibility with insulating glass unit sealants prior to purchase.
 - .3 Colour: To be selected by Consultant.
 - .4 Basis of Design:
 - .1 Dowsil 795 Silicone Building Sealant by Dow.
 - .2 Sikasil WS-295 by Sika Canada.
 - .3 Spectrum 2 by Tremco.
 - .4 Or approved equal.
 - .2 Joint backing: to ASTM C1330; Round, solid section, soft polyethylene foam gasket compatible with primer and sealant materials.
 - .3 Primer: As recommended by sealant manufacturer.
- .10 Airseal transition membrane:
 - .1 Membrane: Self-adhering 1.0 mm thick rubberised asphalt water resistive air barrier. Basis of Design:
 - .1 Blueskin SA by Henry Company Canada.
 - .2 Sopraseal Stick 1100T by Soprema Canada.
 - .3 ExoAir 110 by Tremco.
 - .4 Air-Shield by W.R. Meadows.
 - .2 Primer: Water based low VOC adhesive. Basis of Design:
 - .1 Aquatac Primer by Henry Company Canada.
 - .2 Elastocol Stick H20 by Soprema Canada.
 - .3 ExoAir Primer by Tremco.
 - .4 Mel-Prime W/B by W.R. Meadows.

2.04 FABRICATION

- .1 Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- .2 Construct doors square, plumb and free from distortion, waves, twists, buckles or other defects detrimental to performance or appearance.
- .3 Fabricate stiles and rails of tubular extrusions designed for mechanical shear block fastening in combination with SIGMA deep penetration plug welds and fillet welds at all stile/rail connections.
- .4 Install door hardware.
- .5 Perform aluminum welding to CAN/CSA W59.2.

- .6 Prepare components to receive anchor devices. Install anchors.
- .7 Arrange fasteners and attachments to ensure concealment from view.
 - .1 Ensure fasteners do not penetrate thermal break.
 - .2 If fasteners cannot be concealed, countersunk screws finished to match adjacent material may be acceptable only upon written approval from Consultant.
- .8 Prepare doors to receive glazing as indicated on drawings.
- .9 Visible manufacturer's identification labels not permitted.
- .10 Flashings: Minimum 3 mm thick aluminum, finish to match aluminum doors, secured with concealed fastening method.

2.05 FINISHES

- .1 Exposed aluminum surfaces:
 - .1 To AAMA 2605, 3-coat, thermal setting enamel consisting of primer, colour coat and clear coat with 70% minimum fluoropolymer resin and polyvinylidene fluoride (PVDF)
 - .2 Dry film thickness: 0.03 mm (1.2 mil) minimum total thickness.
 - .3 Acceptable coating: Duranar XL by PPG Industries.
 - .4 Colour: To be selected by Consultant.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.
- .2 Verify wall openings and adjoining air barrier and vapour retarder materials are ready to receive work of this Section.

3.02 INSTALLATION

- .1 Install aluminum entrances and doors in accordance with manufacturer's instructions.
- .2 Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

- .3 Use alignment attachments and shims to permanently fasten doors to building substrate. Clean weld surfaces; apply protective primer to field welds and adjacent surfaces.
- .4 Align door assembly plumb and level, free of warp or twist. Maintain door assembly dimensional tolerances and align with adjacent work.
- .5 Use thermal isolation where components penetrate or disrupt building insulation.
- .6 Co-ordinate attachment and seal of perimeter air barrier and vapour retarder materials.
- .7 Install flashings.
- .8 Install glass in accordance with Section 08 81 00.
- .9 Install perimeter sealant to method required to achieve performance criteria.
- .10 Adjust operable parts for correct function and ensure doors do not bind while opening and closing.

3.03 CLEANING

- .1 Leave Work area clean at end of each day.
- .2 Remove protective material from prefinished aluminum surfaces.
- .3 Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- .4 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.

1.02 REFERENCES

- .1 ASTM A653/A653M - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
- .2 CAN/ULC S104 - Standard Method for Fire Tests of Door Assemblies.
- .3 CAN/ULC S105 - Standard Specification for Fire Door Frames Meeting the Performance Required by CAN/ULC S104.
- .4 NFPA 80 - Standard for Fire Doors and Fire Windows.

1.03 ADMINISTRATIVE REQUIREMENTS

- .1 Site Meetings: Arrange a pre-installation meeting on Site to be attended by Consultant, Contractor, coiling counter fire shutter manufacturer's representative, and any other parties directly affecting work of this Section to:
 - .1 Examine substrate conditions for compliance with manufacturer's requirements.
 - .2 Review methods and procedures related to installation.
 - .3 Review all typical and special details as required to complete the work of this section.

1.04 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for coiling counter fire shutters including product characteristics, performance criteria, shutter components, and limitations.
- .3 Shop Drawings: Submit Shop Drawings as follows:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Shop Drawings to illustrate details, dimensions, fabrication and installation details.
 - .3 Indicate each type of shutter, arrangement of hardware, required clearances.

- .4 Indicate assembly details and dimensions of fabrication, required clearances.
- .4 Reports/certificates: Submit the following:
 - .1 Certified test reports showing compliance with specified performance characteristics and physical properties.
 - .2 Certifications: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.05 CLOSEOUT AND MAINTENANCE SUBMITTALS

- .1 Submit closeout and maintenance submittals in accordance with Section 01 78 00.
- .2 Closeout Product data: Submit manufacturers maintenance and cleaning data for incorporation into operation and maintenance manual including product warranty documentation.

1.06 QUALITY ASSURANCE

- .1 Manufacturers: Company specializing in manufacturing the products specified in this section with minimum 5 years experience.
- .2 Installers: Perform Work of this Section by a company that has a minimum of five (5) years proven experience in the installation of coiling counter fire shutters of a similar size and nature.

1.07 WARRANTY

- .1 Provide extended warranty for coiling counter fire shutters in accordance with the General Conditions, except warranty is extended to two (2) years from date Ready-for-Takeover has been attained:
 - .1 Warranty to cover defects including failure to meet specified design criteria, and finish failure.
 - .2 Warranty shall cover complete replacement of Work, including adjacent work impacted.

2 PRODUCTS

2.01 SYSTEMS AND MANUFACTURERS

- .1 Rated Roll Up Fire Rated Counter Shutter by CornellCookson Doors.
- .2 Fire Rated Rolling Counter Door Model 640 by Overhead Door Corporation.
- .3 Fire Rated Counter Shutter Model 540 by Wayne Dalton Garage Doors.

- .4 Or approved equal.

2.02 PERFORMANCE CRITERIA

- .1 Design coiling counter fire shutters as manual operated.
- .2 Provide labelled and listed coiling fire shutters by an organization accredited by Standards Council of Canada in conformance with CAN4-S104 and CAN4-S105 for ratings specified or indicated.

2.03 MATERIALS

- .1 Galvanized steel sheet: ASTM A653/A653M, commercial quality with Coating Designation Z275.
- .2 Zinc-rich primer:
 - .1 Carbozinc 11WB by Carboline.
 - .2 Dimetcote 9H by PPG.
 - .3 Zinc Clad XL by Sherwin Williams.

2.04 SHUTTER FABRICATION

- .1 Coiling shutter curtain interlocking sections:
 - .1 Roll formed steel, minimum 0.6 mm (24 ga) base metal thickness for slat face and backer, prime painted.
 - .2 Profile: Flat.
- .2 Provide interlocking continuous slat sections with metal end locks secured with two rivets.
- .3 Bottom bar to consist of steel channel with continuous lift handle and bottom seal.
- .4 Form guides of galvanized steel grooved guides to retain curtain.
- .5 Construct counterbalance assembly of heat treated torsion spring with 25% overload factor.
 - .1 Enclose spring in steel pipe to support shutter curtain and counterbalance mechanism with maximum deflection of 2.5 mm per m (0.03" per ft) of opening width.
 - .2 Include spring tension adjusting wheel, accessible for setting.
- .6 Enclose counterbalance assembly with minimum 0.6 mm (24 ga) galvanized steel sheet formed hood with internal flame baffle.

2.05 MANUAL OPERATION

- .1 Provide manual push up lift.

2.06 FINISHES

- .1 Powder coat finish: Provide 0.2 mil baked-on primer coat, followed by 0.6 mil thick polyester top coat in colour to be selected by Consultant from manufacturers standard colour range.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.02 INSTALLATION

- .1 Install coiling counter fire shutters in accordance with manufacturer's written instructions, and reviewed Shop Drawings.
- .2 Install coiling counter fire shutter in accordance with NFPA 80 to suit fire protection rating required.
- .3 Install fusible link activated automatic closing device to cause door to close at controlled even speed in case of fire.
- .4 Adjust operating components to ensure smooth opening and closing of shutters.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.
- .2 Work may include, but is not limited to;
 - .1 Sliding automatic entrance systems.

1.02 REFERENCES

- .1 AAMA 611 - Voluntary Specifications for Anodized Finishes Architectural Aluminum.
- .2 AAMA 701 - Performance Specification for Pile Weatherstrips.
- .3 ANSI/BHMA A156.5 - American National Standard for Cylinders and Input Devices for Locks.
- .4 ANSI/BHMA A156.10 - Power Operated Pedestrian Doors.
- .5 ASTM A167 - Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .6 ASTM B209 - Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
- .7 ASTM B221 - Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
- .8 ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- .9 ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants.

1.03 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Co-ordinate work of this Section with installation of additional supports, glazing, and components or materials.

1.04 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.

- .2 Product data: Submit manufacturers product data for sliding automatic entrance systems including anchorage and fasteners, glass and infill, and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings: Submit Shop Drawings as follows:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Shop Drawings to illustrate details, dimensions, fabrication and installation details.
 - .3 Indicate system 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.
 - .4 Include structural support framing components and physical characteristics, calculations, dimensional limitations, and special installation requirements.
 - .5 Submit complete electrical wiring diagrams including electrical schematics and sequence of operation for doors.
- .4 Samples: Submit 300 mm x 300 mm samples illustrating colours, textures and finishes including, but not limited to:
 - .1 Prefinished metal surface, finish, colour, and texture.
 - .2 Insulating glass unit.
- .5 Reports/certificates: Submit the following:
 - .1 Test Reports: Submit substantiating engineering data, test results of previous tests by independent laboratory which purport to meet performance criteria, and supportive data.

1.05 CLOSEOUT AND MAINTENANCE SUBMITTALS

- .1 Submit closeout and maintenance submittals in accordance with Section 01 78 00.
- .2 Closeout Product data: Submit manufacturers maintenance and cleaning data for incorporation into operation and maintenance manual including product warranty documentation.

1.06 QUALITY ASSURANCE

- .1 Manufacturers: Company specializing in manufacturing the products specified in this section with minimum 5 years experience.
- .2 Installers: Perform Work of this Section by a company that has a minimum of five (5) years proven experience in the installation of sliding automatic entrance systems of a similar size and nature.

1.07 DELIVERY, STORAGE, AND HANDLING

- .1 Handle work of this Section in accordance with AAMA CW-10.
- .2 Protect prefinished surfaces with wrapping or strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1.08 SITE CONDITIONS

- .1 Ambient Conditions: Install sealants when ambient and surface temperature is above 5 degrees C minimum. Maintain this minimum temperature during and for 48 hours minimum after installation of sealants.

1.09 WARRANTY

- .1 Provide extended warranty for sliding automatic entrance systems in accordance with the General Conditions, except warranty is extended to five (5) years from date Ready-for-Takeover has been attained:
 - .1 Warranty to cover defects including failure to remain fully operational and functional, finish failure and failure to meet design criteria.
 - .2 Warranty shall cover complete replacement of Work, including adjacent work impacted.

2 PRODUCTS

2.01 SYSTEMS AND MANUFACTURERS

- .1 Model SL500 by Assa Abloy.
- .2 ProSlide S2021 by Horton Automatics.
- .3 Model GT 1175 Series by Nabco Entrances Inc.
- .4 Dura-Glide 2000 by Stanley Access Technologies.

2.02 PERFORMANCE CRITERIA

- .1 Design sliding automatic entrances to resist loads and climatic data as indicated, and in accordance with applicable building codes.
- .2 Design system to prevent excessive deflection and permanent or progressive glazing displacement. Restrict horizontal and vertical deflection to L/175 maximum.
- .3 Design system to drain any water entering at joints and any condensation occurring within the door assembly to exterior face of the door assembly.

- .4 Design door for a operating range of Minus 34 deg C to 54 deg C.
- .5 Design sliding automatic door system for the following forces:
 - .1 Opening-Force Requirements for Egress Doors: Force shall be adjustable; but, not more than 222 N required to manually set swinging egress door panel(s) in motion to ANSI/BHMA A156.10.
 - .2 Closing-Force Requirements: Not more than 133 N required to prevent door from closing.

2.03 OPERATION

- .1 Sliding Automatic Entrances:
 - .1 Bi-Parting Entrances:
 - .1 Configuration: Two sliding leaves and two full sidelights.
 - .2 Traffic Pattern: Two-way.
 - .3 Emergency Breakaway Capability: Sliding leaves only.
 - .4 Mounting: Surface applied.
- .2 Obstruction Recycle:
 - .1 Provide system to re-cycle sliding panels when an obstruction is encountered during closing cycle. If obstruction is detected, system shall search for that object on next closing cycle by reducing door closing speed prior to previously encountered obstruction location, and will continue to close in check speed until doors are fully closed, at which time doors will reset to normal speed.
 - .2 If obstruction is encountered again, door will come to a full stop.
 - .3 Doors shall remain stopped until obstruction is removed and operate signal is given, resetting door to normal operation.
- .3 Activation and Safety Devices:
 - .1 Combined Activation and Safety Sensors: Combined activation and safety sensors shall, in a single housing, detect motion and presence in accordance with ANSI/BHMA A156.10. Motion shall be detected using K-band microwave technology, presence by active infrared reflection technology.
 - .1 Mounting Height: Up to 3.5 m above finish floor.
 - .2 Temperature Range: Between -35°C to 55°C in all environmental conditions.
 - .3 Relays: Form C, 50V at 0.3A for both activation and safety. Hold time of less than 0.5 seconds.
 - .4 Detection Pattern: When detection is made in activation zone, and entrance opens, safety zone shall extend through threshold on each side; creating an X-pattern. When activation and safety zones are cleared and entrance closes sensor will ignore X-pattern safety zones.

- .5 Combined motion and presence sensors shall be equal to or better than X-Zone Sensor by Optex.
- .2 Photoelectric Beams: In addition to threshold sensor include a minimum of two (2) doorway holding beams. Photoelectric beams shall be pulsed infrared type, including sender receiver assemblies for recessed mounting.
- .3 Presence Sensor Monitoring: Sliding automatic entrances control system shall include a means to verify the functionality of all active presence sensors in accordance with ANSI/BHMA A156.10. A detected fault shall cause automatic operation to cease until the fault is corrected.

2.04 MATERIALS

- .1 Extruded aluminum: To ASTM B221, 6063 alloy with T6 temper.
- .2 Sheet aluminum: To ASTM B209, utility grade for unexposed surfaces.
- .3 Steel sections: to ASTM A167 Type 316 stainless.
- .4 Glass and glazing: In accordance with Section 08 81 00.
- .5 Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories compatible with adjacent materials.
- .6 Sealant Materials:
 - .1 Sealant:
 - .1 Single-component, neutral cure, silicone sealant conforming to ASTM C920, Type S, Grade NS, Class 50.
 - .2 Colour: To be selected by Consultant.
 - .3 Basis of Design:
 - .1 Dowsil 795 Silicone Building Sealant by Dow.
 - .2 Sikasil WS-295 by Sika Canada.
 - .3 Spectrum 2 by Tremco.
 - .4 Or approved equal.
 - .2 Joint backing: to ASTM C1330; Round, solid section, soft polyethylene foam gasket compatible with primer and sealant materials.
 - .3 Primer: As recommended by sealant manufacturer.

2.05 COMPONENTS

- .1 Framing Members: Manufacturer's standard 45 mm x 115 mm extruded aluminum framing reinforced as required to support imposed loads. Framing shall incorporate concealed fastening pocket, and continuous flush insert cover, extending full length of each framing member.

- .2 Stile and Rail Doors and Sidelights: Manufacturer's standard 45 mm thick glazed doors with extruded-aluminum tubular stile and rail members. Incorporate concealed tie-rods that span full length of top and bottom rails.
 - .1 Glazing Stops and Gaskets: Snap-on, extruded-security aluminum stops and preformed gaskets.
 - .2 Narrow stile; 51 mm.
 - .3 Bottom Rail Design: Minimum 102 mm nominal height.
 - .4 Muntin Bars: 51 mm nominal width.
- .3 Headers: Fabricated from extruded aluminum and extending full width of automatic entrance door units to conceal door operators, carrier assemblies, and roller tracks. Provide hinged or removable access panels for service and adjustment of door operators and controls. Secure panels to prevent unauthorized access.
 - .1 Mounting: Concealed, with one side of header flush with framing.
 - .2 Capacity: Capable of supporting up to 100 kg per panel, up to four panels, over spans up to 4.3 m without intermediate supports.
- .4 Carrier Assemblies and Overhead Roller Tracks: Manufacturer's standard carrier assembly that allows vertical adjustment of at least 3 mm; consisting of urethane with precision steel lubricated ball-bearing wheels, operating on a continuous roller track. Support panels from carrier assembly by load wheels and anti-riser wheels with factory adjusted cantilever and pivot assembly. Minimum two ball-bearing load wheels and two anti-rise rollers for each active leaf. Minimum load wheel diameter shall be 64 mm; minimum anti-rise roller diameter shall be 51 mm.
- .5 Thresholds: Manufacturer's standard thresholds to conform to details and requirements for code compliance.
- .6 Signage: Provide permanent signage/decals to sidelites and sliding doors in accordance with ANSI/BHMA A156.10.
- .7 Door Operators:
 - .1 Provide door operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for long-term, operation under normal traffic load for type of occupancy indicated.
 - .2 Electromechanical Operators: Self-contained overhead unit powered by a minimum of 1/4 horsepower, permanent-magnet DC motor with gear reduction drive, microprocessor controller; and encoder.
 - .1 Operation: Power opening and power closing.
 - .2 Mounting: Concealed.
 - .3 Drive System: Synchronous belt type.
 - .3 Electrical service to door operators to be provided by Division 26. Minimum service to be 120 VAC, 5 amps.

- .8 Electrical Controls:
 - .1 Electrical Control System: Electrical control system consisting of microprocessor controller and high-resolution position encoder. Encoder shall monitor revolutions of operator shaft and send signals to microprocessor controller to define door position and speed.
 - .2 Programmable Controller: Microprocessor controller shall be field programmable for the following:
 - .1 Operating speeds and forces as required to meet specified ANSI/BHMA standard.
 - .2 Adjustable and variable features specified.
 - .3 Reduced opening position.
 - .4 Manual programming shall be available through local interface which has a two-digit display with a selection control including three push buttons.
- .9 Hardware:
 - .1 Emergency Breakaway Feature: Provide release hardware that allows panel(s) to swing out in direction of egress to full 90 degrees from any position in sliding mode. Interrupt powered operation of panel operator while in breakaway mode.
 - .2 Deadlocks: Manufacturer's standard deadbolt operated by exterior cylinder and interior thumb turn; with minimum 25 mm long throw bolt; ANSI/BHMA A156.5, Grade 1.
 - .3 Control Switch: Provide manufacturer's standard header mounted rocker switches and door position switch to allow for full control of the automatic entrance door.
 - .4 Power Switch: Sliding automatic entrances shall be equipped with a two position On/Off rocker switch to control power to the door.
 - .5 Sliding Weather Stripping: Manufacturer's standard replaceable components complying with AAMA 701; made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.
 - .6 Weather Sweeps: Manufacturer's standard adjustable nylon brush sweep mounted to underside of door bottom.

2.06 FABRICATION

- .1 Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- .2 Construct frames square, plumb and free from distortion, waves, twists, buckles or other defects detrimental to performance or appearance.
- .3 Fabricate tubular and channel frame assemblies with manufacturer's standard mechanical or welded joints. Provide sub-frames and reinforcement as required for a complete system to support required loads.

- .4 Perform fabrication operations in manner that prevents damage to exposed finish surfaces.
- .5 Form profiles that are sharp, straight, and free of defects or deformations.
- .6 Prepare components to receive concealed fasteners and anchor and connection devices.
- .7 Fabricate components with accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion.
- .8 Visible manufacturer's identification labels not permitted.

2.07 FINISHES

- .1 Anodized aluminum surfaces:
 - .1 To AAMA 611, Architectural Class I anodized AA-M10C21A44.
 - .2 Dry film thickness: 0.7 mil minimum total thickness.
 - .3 Colour: To be selected by Consultant.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.
- .2 Verify substrates are ready to receive work of this Section.

3.02 INSTALLATION

- .1 Install sliding automatic entrances in accordance with manufacturer's instructions.
- .2 Fit frame joints to produce joints free of burrs and distortion. Rigidly secure non-movement joints.
- .3 Install sliding automatic entrances plumb and true in alignment with established lines and grades without warp or rack of framing members and doors. Anchor securely in place.
- .4 Install glass in accordance with Section 08 81 00.
- .5 Install perimeter sealant to method required to achieve performance criteria.

- .6 Provide glass presence markers as approved by system manufacturer. Markers are to be installed in two cross stripes extending from diagonal corners.

3.03 ADJUSTING

- .1 Adjust door operators, controls, and hardware for smooth and safe operation, for tight closure, and complying with requirements in ANSI/BHMA A156.10.

3.04 CLEANING

- .1 Leave Work area clean at end of each day.
- .2 Remove protective material and glass presence markers.
- .3 Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- .4 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.

1.02 REFERENCES

- .1 BHMA - Builders Hardware Manufacturing Association.
- .2 CSA B651 - Accessible Design for the Built Environment.
- .3 DHI - Door and Hardware Institute.
- .4 NFPA 80 - Standard for Fire Doors and Other Opening Protectives.

1.03 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
 - .1 Coordinate with door and frame manufacturer for components to receive hardware including internal reinforcement for door hardware, conduit, wiring and electrical work required for electrically operated hardware items.
 - .2 No extra cost will be allowed because of failure to coordinate door hardware requirements with door and frame manufacturer to ensure proper installation of hardware.

1.04 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for door hardware including product characteristics, performance criteria, and limitations.
- .3 Shop Drawings: Submit Shop Drawings as follows:
 - .1 Shop Drawings to illustrate door locations, sizes and installation details, complete with manufacturer's catalogue numbers, finish symbols and quantities.
 - .2 Provide templates to door and frame manufacturer outlining sizes, locations and reinforcement required for hardware.
 - .3 Hardware Lists: Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.

- .4 Samples:
 - .1 Submit two samples for any hardware item that deviates from hardware listed in Hardware Schedule. Verify list of samples to be provided with Consultant.
 - .2 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.
 - .3 Hardware will not be ordered until samples have been approved.
- .5 Reports/certificates: Submit the following:
 - .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
 - .2 Submit manufacturer's certificate that finish hardware and fire rated hardware meets specified requirements.
 - .3 Manufacturer's Instructions: submit manufacturer's installation instructions.

1.05 CLOSEOUT AND MAINTENANCE SUBMITTALS

- .1 Submit closeout and maintenance submittals in accordance with Section 01 78 00.
- .2 Closeout Product data: Submit manufacturers maintenance and cleaning data for incorporation into operation and maintenance manual.
- .3 Maintenance materials: Submit extra two sets of wrenches for door closers, locksets, fire exit hardware and any additional hardware requiring special tools.

1.06 QUALITY ASSURANCE

- .1 Manufacturers: Manufacturers to be certified under BHMA.
- .2 Suppliers: Provide Work of this Section by a company that supplies commercial door hardware and is acceptable to manufacturer.
- .3 Employ an Door and Hardware Consultant certified in accordance with DHI certification program to prepare hardware schedule and inspect completed installation and certify that hardware has been installed in accordance with manufacturer's printed instructions, Authorities having Jurisdiction and as specified.

1.07 DELIVERY, STORAGE, AND HANDLING

- .1 Package items of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .2 Accept Products of this Section on Site and ensure that each item is undamaged.
- .3 Catalogue and store hardware in secure area.

2 PRODUCTS

2.01 MATERIALS

- .1 Check and verify prepared Hardware List against Contract Drawings to confirm that hardware listed is designed to be used as specified. Inform Consultant of possible issues relating to selected hardware.
- .2 Furnish hardware made of new material by approved manufacturers, including electrical components.
- .3 Provide hardware items with accessories complete to function as intended.
- .4 Ensure that each hardware item is of same type, design and by same manufacturer.
- .5 Manufacturer's names or trade marks are not permitted on exposed surfaces of hardware.
- .6 Fire rated assemblies:
 - .1 Selected and installed in accordance with applicable codes and regulations, NFPA 80 and to approval of [Ontario] Fire Marshal.
 - .2 ULC labelled hardware. Submit written certification of conformance to ULC requirements for each type of hardware prior to delivery.
- .7 Electrical: Make provisions and coordinate requirements for electrical devices in connection with hardware.
- .8 Reinforcing Units: Furnished by door manufacturer, coordinated by hardware manufacturer.
- .9 Concealed Hardware: Furnish items which must be concealed within metal work to metal door and frame manufacturer.
- .10 Fasteners: Furnish as recommended by manufacturer and as required to securely install hardware:
 - .1 Furnish hardware fastened to concrete or masonry with expansion sleeve anchors.
 - .2 Through bolts are not permitted on wood or metal doors.
 - .3 Furnish fasteners for items applied to gypsum board sufficiently long to provide solid connection to framing or backing.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.
- .2 Inspect doors, frames and other surfaces to receive items of finish hardware and report any defects, which might adversely affect the installation and function of the hardware.
- .3 Verify that power supply is available to power operated devices.

3.02 INSTALLATION

- .1 Install hardware in accordance with manufacturers' instructions and recommendations.
- .2 Fit hardware prior to painting, then remove prior to painting doors and frames; reinstall after painting is complete.
- .3 Accessibility: Comply with CSA B651 for positioning requirements for accessibility.
- .4 Mounting Heights Above Finished Floor:
 - .1 Hinges:
 - .1 Top: Frame manufacturer's standard, but not greater than 250 mm from head of frame to centre line of hinge.
 - .2 Bottom: Frame manufacturer's standard, but not greater than 318 mm from floor to centre line of hinge.
 - .3 Intermediate: Equally spaced between top and bottom hinges and from each other.
 - .2 Locks and Latches: 966 mm to centre line of lever.
 - .3 Panic Exit Devices: Manufacturer's standard for device specified.
 - .4 Door pulls, Push-Pull Bars, Push Plates: 1067 mm to centre of pull, bar or plate.
 - .5 Comply with recommendations of BHMA for heights of items not indicated.

3.03 SITE QUALITY CONTROL

- .1 Hardware to be inspected by certified inspector qualified through the DHI certification program. Provide written certification of the following:
 - .1 That hardware has been supplied and installed in accordance with Specifications and hardware manufacturer's instructions and is functioning correctly.

- .2 Fire rated openings are installed in compliance with NFPA 80 requirements and Authorities having Jurisdiction.
- .3 Access control system and electrified hardware devices are operating correctly and electric door release hardware operates properly upon activation of fire alarm system.

3.04 ADJUSTMENT

- .1 Adjust closers, locks, and critical operation hardware.

3.05 SCHEDULE

- .1 Refer to Drawings for Hardware Schedule.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.

1.02 REFERENCES

- .1 AAADM - American Association of Automatic Door Manufacturers.
- .2 AAMA 611 - Voluntary Specifications for Anodized Finishes Architectural Aluminum.
- .3 ASTM B209 - Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
- .4 ASTM B221 - Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
- .5 ANSI/BHMA A156.10 - Power Operated Pedestrian Doors.
- .6 ANSI/BHMA A156.19 - Power Assist and Low Energy Power Operated Doors.

1.03 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Co-ordinate work of this Section with installation of electrical wiring and connections as well as coordination with security systems as required.

1.04 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for power door operators including product characteristics, performance criteria, and limitations.
- .3 Shop Drawings: Submit Shop Drawings as follows:
 - .1 Shop Drawings to illustrate electrical connections, attachments, reinforcing, anchorage and installation details.
 - .2 Mounting heights for operators and electrical wiring.

1.05 CLOSEOUT AND MAINTENANCE SUBMITTALS

- .1 Submit closeout and maintenance submittals in accordance with Section 01 78 00.
- .2 Closeout Product data: Submit manufacturers maintenance and cleaning data for incorporation into operation and maintenance manual.

1.06 QUALITY ASSURANCE

- .1 Manufacturers: Company specializing in manufacturing the products specified in this section with minimum 5 years experience.
- .2 Installers: Perform Work of this Section by a company that has a minimum of five (5) years proven experience in the installation of power door operators of a similar size and nature and hold a current certificate issued by AAADM.

2 PRODUCTS

2.01 SYSTEMS AND MANUFACTURERS

- .1 Besam Power Swing by Assa Abloy Group.
- .2 HD Swing LE by Horton.
- .3 M-Force LE by Stanley Access Technologies.
- .4 Or Consultant approved equal.

2.02 PERFORMANCE CRITERIA

- .1 Design self contained, low-energy electro-hydraulic door opener conforming to ANSI/BHMA A156.10 and A156.19.
- .2 Provide operators to resist thermal, dead and live loads calculated for the Place of the Work.
- .3 In the event of power failure, doors shall open with manual force, not to exceed 133 N to set door in motion, and not more than 66 N to fully open door. Forces shall be applied at 25 mm from latch edge of door.
- .4 Emergency-Exit Door Requirements: Comply with requirements of authorities having jurisdiction for swinging automatic entrance doors serving as a required means of egress.

2.03 MATERIALS

- .1 Extruded aluminum bars, rods, profiles and tubes: to ASTM B221, 6063 alloy with T6 temper.
- .2 Aluminum sheet and plate: to ASTM B209.

- .3 Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories compatible with adjacent materials.
- .4 Electrical service: Provide by Division 26.

2.04 COMPONENTS

- .1 Header Case: Header case shall not exceed 150 mm square in section and shall be fabricated from extruded aluminum with structurally integrated end caps, and be designed to conceal door operators and controls. Seal operator against dust, dirt, and corrosion within header case. Operator and electronic control box shall be provided with a removable full-length cover secured to prevent unauthorized access.
- .2 Door Arms: Combination of door arms and linkage providing positive control of door through entire swing; units shall permit use of butt hung, centre pivot, and offset pivot-hung doors.
- .3 Signage: Provide signage in accordance with ANSI/BHMA A156.19.
- .4 Electromechanical Operator: Self-contained unit powered by a minimum 3/16 horsepower, permanent-magnet DC motor; through high torque reduction gear system.
 - .1 Operation: Power opening and spring closing.
 - .2 Operator Type: Low energy; readily convertible to full energy without the use of tools.
 - .3 Handing: Non-handed.
 - .4 Capacity: Rated for door panels weighing up to 318 kg (700 lb).
 - .5 Mounting: Visible
- .5 Electrical Control System: Microprocessor controller and high-resolution position encoder. Encoder shall monitor revolutions of operator shaft and send signals to microprocessor controller to define door position and speed.
 - .1 High-resolution encoder shall have a resolution of not less than 1024 counts per revolution. Systems utilizing external magnets and magnetic switches are not acceptable.
 - .2 Electrical control system shall include 24 VDC auxiliary output rated at 1 amp.
 - .3 Microprocessor controller shall be field programmable for the following parameters:
 - .1 Operating speeds and forces as required to meet specified ANSI/BHMA standard.
 - .2 Adjustable and variable features specified.
 - .4 Manual programming shall be available through local interface which has a two-digit display with a selection control including three push buttons.

2.05 OPERATION

- .1 Activation Device: Motion Detector with narrow or wide zone adjustable from 0 to 70 degrees. Sensitivity of detection shall be adjustable from 0 MW to 10 MW maximum.
- .2 Spring Closing Operation: The operator shall close the door by spring energy employing the motor, as a dynamic brake to provide closing speed control. The closing spring shall be a helical compression spring, adjustable for positive closing action. The spring shall be adjustable, without removing the operator from the header, to accommodate a wide range of field conditions.
- .3 Emergency Breakout Switch: A cam actuated emergency breakout switch shall be provided to disconnect power to the motor when an in-swinging door is manually pushed in the emergency out direction. The operator will then automatically reset, and power will be resumed.
- .4 Control Switch: Automatic door operators shall be equipped with a three-position function switch to control the operation of the door. Control switch shall provide three modes of operation, Automatic, Off, and Hold-Open.
- .5 Power Switch: Automatic door operators shall be equipped with a two position On/Off switch to control power to the door.
- .6 Independent Adjustable Closing and Latching Speed Control: The operator shall employ a rheostat module to allow for independent field adjustment of closing and latching speeds using the motor as a dynamic brake.
- .7 Field Adjustable Open Stop: The operator shall provide a field adjustable open stop to accommodate opening angles from 80 to 135 degrees without the need for additional components.
- .8 Consistent Cycle: The operator shall deliver an even, consistent open manual push force across the entire transition from door fully closed to door fully open. Additionally, the force shall be field adjustable to accommodate a wide range of on-site conditions.
- .9 Manual Use: The operator shall function as a manual door closer in the direction of swing with or without electrical power. The operator shall deliver an even, consistent open force across the entire transition from door fully closed to door fully open.
- .10 Power Assist: Operator mode that lowers opening forces when the door is used manually. Power assist is active only while pushing or pulling the door. The door will close when an opening force is no longer applied.

- .11 Power Close: When enabled, engages the operator to close a door that does not close completely at the end of a cycle.
- .12 Force Compensation: Utilizing the closed loop speed control, the operator shall maintain constant opening and closing speeds when subjected to excessive outside forces, such as positive or negative stack pressures.
- .13 Slam Protection: The operators speed control system prevents door from slamming at the full open or full closed position.
- .14 Lock Release: On doors with electric locking, operator shall include a closing function to release tension on a latch mechanism prior to opening the door.

2.06 FINISHES

- .1 Exposed aluminum surfaces:
 - .1 To AAMA 611, Architectural Class 2 anodized AA-M10C21A31.
 - .2 Dry film thickness: 0.4 mil minimum total thickness.
 - .3 Colour: Clear.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.
- .2 Inspect doors, frames and other surfaces to receive power door operators and report any defects, which might adversely affect the installation and function of the operators.
- .3 Verify that power supply is available to power operated devices.

3.02 INSTALLATION

- .1 Install power door operators in accordance with manufacturers' instructions and recommendations.
- .2 Fit joints to produce hairline joints free of burrs and distortion. Rigidly secure non-movement joints.
- .3 Install automatic door operators/headers plumb and true in alignment with established lines and grades. Anchor securely in place.

- .4 Install surface-mounted hardware using concealed fasteners to greatest extent possible.
- .5 Set headers, arms and linkages level and true to location with anchorage for permanent support.
- .6 Connect door operators to electrical power distribution system as specified in Division 26.

3.03 SITE QUALITY CONTROL

- .1 Factory Trained Installer shall test and inspect each swinging automatic entrance door to determine compliance of installed systems with applicable ANSI standards.

3.04 ADJUSTMENT

- .1 Adjust door operators, controls, and hardware for smooth and safe operation, for tight closure, and complying with requirements in ANSI/BHMA A156.19 by AAADM Certified Technician.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.

1.02 REFERENCES

- .1 ASTM C542 - Standard Specification for Lock-Strip Gaskets.
- .2 ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- .3 ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.
- .4 ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass.
- .5 ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass.
- .6 ASTM D2240 - Standard Test Method for Rubber Property—Durometer Hardness.
- .7 ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .8 ASTM F1233 - Standard Test Method for Security Glazing Materials and Systems.
- .9 CAN/CGSB 12.1 - Safety Glazing.
- .10 CAN/CGSB 12.8 - Insulating Glass Units.
- .11 IGMAC - Insulating Glass Manufacturers Association of Canada.
- .12 FGIA - Fenestration and Glazing Industry Alliance.

1.03 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for glass and glazing materials including product characteristics, performance criteria, and limitations.

- .3 Shop Drawings: Submit Shop Drawings as follows:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Shop Drawings to illustrate details, dimensions, fabrication and installation details.
 - .3 Detail connections, methods of anchorage, reinforcement, and supports.
- .4 Samples: Submit 300 mm x 300 mm samples illustrating colours, textures and finishes including, but not limited to:
 - .1 Each type insulating unit.
 - .2 Ballistic glass.
- .5 Reports/certificates: Submit the following:
 - .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
 - .2 Compatibility test reports: Submit compatibility and adhesion test reports from sealant manufacturer indicating that glazing materials were tested for compatibility and adhesion with glazing sealants.
 - .3 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
 - .4 Sealed unit certification: Submit current IGMAC Certification, issued within last 6 months, that insulated glass units meet program requirements.

1.04 CLOSEOUT AND MAINTENANCE SUBMITTALS

- .1 Submit closeout and maintenance submittals in accordance with Section 01 78 00.
- .2 Closeout Product data: Submit manufacturers maintenance and cleaning data for incorporation into operation and maintenance manual including product warranty documentation.

1.05 QUALITY ASSURANCE

- .1 Manufacturers: Insulated glass unit manufacturers to be a certified member of FGIA and have passed the certification program.
- .2 Installers: Perform Work of this Section by a company that has a minimum of five (5) years proven experience in the installation of glazing units of a similar size and nature.
- .3 Fire rated glass: Each fire rated glass lite shall bear permanent, nonremovable label of ULC certifying it for use in tested and rated fire protective assemblies.

1.06 SITE CONDITIONS

- .1 Ambient Conditions: Work of this Section shall be performed when air and surface temperatures are above 10 degrees C for 24 hours before, during and after installation.
- .2 Maintain ventilated environment for 24 hours after application.

1.07 WARRANTY

- .1 Provide extended warranty for insulated glass units in accordance with the General Conditions, except warranty is extended to ten (10) years from date Ready-for-Takeover has been attained:
 - .1 Warranty to cover defects including defects or deterioration in performance or visual clarity including, but not limited to the following:
 - .1 Dust or film formation on internal glass surfaces.
 - .2 Condensation, or fogging material obstruction of vision. Internal fogging shall be deemed to occur when light transmission of glass has been reduced by 5% in any 50 mm square area.
 - .3 Changes to mechanical design properties.
 - .4 Breakage due to thermal shock and temperature differential due to inherent glass faults, other than extrinsic glass breakage.
 - .5 Breaking of seals, leaking or loss of water and weather tightness.
 - .6 Cracked, or scratched glass, rattling of glazing.
 - .2 Warranty shall cover complete replacement of Work, including adjacent work impacted.

2 PRODUCTS

2.01 MANUFACTURERS

- .1 AGC Glass Company.
- .2 Oldcastle Building Envelope.
- .3 Vitro Architectural Glass.

2.02 PERFORMANCE CRITERIA

- .1 Design glass and glazing systems to resist loads and climatic data as indicated, and in accordance with applicable building codes.
- .2 All glass units containing similar coatings are to be produced in a single production run to ensure continuity of colour and finish.

- .3 Ensure continuity of building enclosure vapour and air barrier using glass and glazing materials as follow:
 - .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/E330M.
 - .3 Limit glass deflection to flexural limit of glass with full recovery of glazing materials.
- .4 Insulating unit thermal stress:
 - .1 Perform thermal stress analysis on insulated glass units, including those containing Low-E coatings, and provide heat strengthening and/or tempered units as necessary to prevent thermal breakage.
 - .2 Design glass units to prevent thermal stress fracture due to heat build-up behind insulating units as required.
- .5 Ensure all glass edges are free of defects which could compromise the integrity of the glass unit or its seals.

2.03 MATERIALS

- .1 Tempered glass: to CAN/CGSB 12.1, glazing quality tempered, kind FT, produced in accordance with ASTM C1048.
- .2 Laminated security glass:
 - .1 to consisting of glass panes with security films produced in accordance with ASTM C1172.
 - .2 Security resistance to ASTM F1233, Class 1.4 HG3 (9 mm handgun).
 - .3 Basis of Design: Armorgarde Plus by Oldcastle Building Envelope or approved equal.
- .3 Low emissivity (LOW E) coating:
 - .1 ASTM C1376, soft, sputtered metallic coating. Provide edge deletion through all coating layers using method approved by manufacturer.
 - .2 Basis of Design:
 - .1 EnergySelect 36 by AGC Glass Company.
 - .2 Cardinal LoE²-272 by Cardinal Glass Industries.
 - .3 SunGuard SuperNeutral SN 68 by Guardian Glass Industries.
 - .4 Or approved equal.
- .4 Insulating glass units:
 - .1 CAN/CGSB 12.8, double glazed, hermetically sealed, argon filled insulating glass units with low conductance stainless steel warm edge spacer.
 - .2 Comply with IGMA labelling requirements to provide certified insulating glass units, including providing materials, excluding glass, from same manufacturer.

2.04 ACCESSORIES

- .1 Setting blocks: EPDM, 80-90 Shore A durometer hardness to ASTM D2240, size to suit glazing method, glass light weight and area.
- .2 Spacer shims: Neoprene, 50-60 Shore A durometer hardness to ASTM D2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self adhesive on one face.
- .3 Glazing tape:
 - .1 Storefronts, windows, etc.: Preformed butyl compound with integral EPDM shim, coiled on release paper, black colour.
- .4 Glazing splines: resilient polyvinyl chloride, extruded shape to suit glazing channel retaining slot, colour as selected.
- .5 Security glass film sealant: One component, neutral cure elastomeric adhesive sealant to ASTM C920, Type S, Grade NS, Class 50. Basis of Design: Dowsil 995 or approved equal.
- .6 Lock-strip gaskets: to ASTM C542.

2.05 FABRICATION

- .1 Clearly label all glazing with maker's name and glass type. Ensure labels are easily removable, non-residue depositing type.
- .2 Perform glass and glazing work in accordance with GANA providing smooth finished surfaces free from distortion and defects detrimental to appearance and performance.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.02 PREPARATION

- .1 Clean contact surfaces with solvent and wipe dry.
- .2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.

- .3 Prime surfaces scheduled to receive sealant.

3.03 INSTALLATION

- .1 Install glazing in accordance with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Perform work in accordance with GANA Glazing Manual for glazing installation methods.
- .3 Exterior: Wet/Dry Method:
 - .1 Cut glazing tape to length and set against permanent stops, 6 mm below sight line. Seal corners by butting tape and dabbing with sealant.
 - .2 Apply heel bead of sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete continuity of air and vapour seal.
 - .3 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.
 - .4 Rest glazing on setting blocks and push against tape and heel head of sealant with sufficient pressure to attain full contact at perimeter of light or glass unit.
 - .5 Place glazing tape on glazing light or unit with tape flush with sight line.
 - .6 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, maximum 9 mm below sight line.
 - .7 Apply cap head of sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.
- .4 Interior: Dry Method:
 - .1 Cut glazing tape to length and set against permanent stops, projecting 1.6 mm above sight line.
 - .2 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.
 - .3 Rest glazing on setting blocks and push against tape for full contact at perimeter of light or unit.
 - .4 Place glazing tape on free perimeter of glazing in same manner described.
 - .5 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
 - .6 Knife trim protruding tape.

3.04 CLEANING

- .1 Remove traces of primer, caulking.
- .2 Remove glazing materials from finish surfaces.

- .3 Remove labels.
- .4 Clean glass using approved non-abrasive cleaner in accordance with manufacturer's instructions.

3.05 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Mark each light with an "X" by using removable plastic tape or paste.

3.06 GLAZING SCHEDULE

- .1 The following listed glass thicknesses are minimums and provided for convenience. Provide thicker glass where required by design.
- .2 GL-1: Exterior glazed balustrades:
 - .1 Glass thickness: 12.7 mm tempered glass.
- .3 GL-B1: Single glazed ballistics rated doors and partitions:
 - .1 Glass thickness: 31.75 mm laminated security glass.
- .4 GL-B2: Double glazed ballistic rated insulated unit:
 - .1 Glass: two laminated security glass lites.
 - .2 Total glass unit thickness: 25 mm.
 - .3 Glass coating: surface number 2, low "E".
 - .4 Inert gas fill: 100% pure argon.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.
- .2 Work may include, but is not limited to;
 - .1 Non-structural metal framing.
 - .2 Gypsum board wall and ceilings.
 - .3 Ballistic reinforcing panels.

1.02 REFERENCES

- .1 ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
- .2 ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- .3 ASTM C645 - Standard Specification for Nonstructural Steel Framing Members.
- .4 ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- .5 ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.
- .6 ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- .7 ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
- .8 ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel.
- .9 ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing.
- .10 ASTM C1396/C1396M - Standard Specification for Gypsum Board.
- .11 ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels.

- .12 AWCI - The Association of the Wall and Ceiling Industry.
- .13 CAN/CGSB 51.34M - Vapor Barrier, Polyethylene Sheet for Use in Building Construction (Withdrawn).
- .14 CAN/ULC S115 - Standard Method of Fire Tests of Firestop Systems.
- .15 UL 752 - Standard for Bullet-Resisting Equipment.

1.03 ADMINISTRATIVE REQUIREMENTS

- .1 Site Meetings: Arrange a pre-installation meeting on Site to be attended by Consultant, Contractor, gypsum board manufacturer's representative, and any other parties directly affecting work of this Section to:
 - .1 Examine substrate conditions for compliance with manufacturer's requirements.
 - .2 Review methods and procedures related to installation.
 - .3 Review all typical and special details as required to complete the work of this section.

1.04 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for gypsum board assemblies including product characteristics, performance criteria, and limitations.
- .3 Shop Drawings: Submit Shop Drawings as follows:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Shop Drawings to illustrate framing, supports, bracing, reinforcing, details, dimensions, fabrication and installation details.
 - .3 Provide fire rated designs.
- .4 Samples: Submit 300 mm long samples illustrating colours, textures and finishes including, but not limited to:
 - .1 Corner and casing beads.
 - .2 Vinyl mouldings.
- .5 Reports/certificates: Submit the following:
 - .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.

1.05 QUALITY ASSURANCE

- .1 Installers: Perform Work of this Section by a company that has a minimum of five (5) years proven experience in the installation of gypsum board assemblies of a similar size and nature.

1.06 SITE CONDITIONS

- .1 Ambient Conditions: Work of this Section shall be performed when air and surface temperatures are between 10 degrees C and 21 degrees C for 48 hours prior to and during application of gypsum boards and joint treatment, and for 48 hours minimum after completion of joint treatment.
- .2 Apply board and joint treatment to dry, frost free surfaces.
- .3 Ventilation: ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

2 PRODUCTS

2.01 PERFORMANCE CRITERIA

- .1 Design gypsum board assemblies to resist loads and climatic data as indicated, and in accordance with applicable building codes including seismic loads.
- .2 Design non-structural framing system in accordance with manufacturer's printed directions and ASTM C754.
- .3 Design wall framing system and reinforce as necessary to accommodate and support items attached to and supported by wall framing system and as required to suit height of partitions and indicated gypsum boards.
- .4 Design suspension systems to support entire system including mechanical and electrical items not exceeding 25% of their ultimate load.

2.02 FRAMING MATERIALS

- .1 Non-load bearing channel stud framing: to ASTM C645, 32 mm wide by width as indicated on drawings stud, roll formed hot dipped galvanized steel sheet, for screw attachment of gypsum board. Provide framing as follows:
 - .1 Framing under 3000 mm high: minimum 0.53 mm.
 - .2 Framing over 3000 mm high and non-standard assemblies: 0.91 mm.
 - .3 Knock-out service holes at 460 mm centres.
- .2 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, 32 mm flange height.

- .3 Deflection track: to ASTM C645, top runner with 50 mm deep flange, in thickness to match studs and width to accommodate depth of studs.
- .4 Deflection track (fire rated): to CAN/ULC S115, deflection track designed to allow partition heads to expand and contract with movement while maintaining fire-resistance rating indicated on rated walls in thickness to match studs and width to accommodate depth of studs.
- .5 Metal channel stiffener: 1.4 mm thick cold rolled steel, coated with rust inhibitive coating.
- .6 Drywall furring channels: to ASTM C645, 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.
- .7 Resilient drywall furring: to ASTM C645, 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.
- .8 Shaft wall framing:
 - .1 Steel J-track: to ASTM C645, roll formed sheet steel.
 - .2 Shaft wall stud: to ASTM C645, hot-dipped galvanized C-H, C-T or I studs as required by design.
 - .3 Acceptable manufacturers:
 - .1 Certaineed Gypsum Canada.
 - .2 CGC (USG) Inc.
 - .3 Georgia-Pacific Canada.
 - .4 Or approved equal.
- .9 Hanger wires: to ASTM A641, galvanized soft annealed wire, minimum 2.0 mm (12 gauge) or as required to meet design.
- .10 Tie wire: Galvanized soft annealed wire, minimum 1.0 mm (18 gauge).

2.03 GYPSUM BOARD MATERIALS

- .1 Acceptable manufacturers:
 - .1 Certaineed Gypsum Canada.
 - .2 CGC (USG) Inc.
 - .3 Georgia-Pacific Canada.
- .2 Standard board: to ASTM C1396/C1396M, minimum 40% recycled content, 1200 mm wide x maximum practical length, ends square cut.
 - .1 Regular: 12.7 mm thick.
 - .2 Fire-rated: 15.9 mm thick.

- .3 Abuse resistant, fiber-reinforced gypsum panel (very high impact): to ASTM C1629/C1629M Level III, interior fiber-reinforced gypsum panel and water resistant exterior fiber-reinforced gypsum sheathing panels, 15.9 mm thick, 1200 mm wide x maximum practical length.
- .4 Glass mat water-resistant gypsum tile backing board: to ASTM C1178/C1178M, 15.9 mm thick, 1200 mm wide x maximum practical length.
- .5 Shaft wall gypsum panels: to ASTM C1396; Gypsum wallboard panel, designed for shaft wall assemblies and tested to meet design. 25.4 mm thick.

2.04 ACCESSORIES

- .1 Acoustic/fire insulation: Refer to Section 07 21 00.
- .2 Acoustical sealant: Refer to Section 07 92 00.
- .3 Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, 12 mm wide, with self sticking adhesive on one face, lengths as required.
- .4 Ballistic reinforcing:
 - .1 Ballistic wall panels: 11 mm (7/16") thick multiple ply fibreglass laminate sheet, impregnated with polyester resin binder, conforming to UL 752, Level 3.
 - .2 Batten strap: 100 mm wide strip of ballistic wall panel material.
 - .3 Basis of Design: Ballistic Wall Panels by Gaffco Ballistics or approved equal.
- .5 Steel drill screws: to ASTM C1002, corrosion resistant.
- .6 Stud adhesive: purpose made as recommended by manufacturer.
- .7 Laminating compound: as recommended by manufacturer, asbestos-free.
- .8 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, zinc-coated galvanized steel, 0.5 mm base thickness, perforated flanges, one piece length per location.
- .9 Polyethylene: to CAN/CGSB 51.34, Type 2.
- .10 Joint compound: to ASTM C475/C475M, asbestos-free.
- .11 Joint tape: to ASTM C475/C475M.
 - .1 Paper tape for standard gypsum board.
 - .2 Glass mesh tape for impact resistant gypsum board.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.02 PREPARATION

- .1 Where existing gypsum board work has been demolished and/or damaged and repair work is required, prepare area for new gypsum board finish.
- .2 Prepare areas to be repaired ensuring neat, clean and straight cuts.
- .3 Finish all repair work as specified for new work to ensure consistent finish across all gypsum board surfaces.

3.03 WALL FRAMING INSTALLATION

- .1 Align partition tracks at floor and ceiling and secure at 600 mm on centre maximum.
- .2 Install dampproof 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.
- .4 Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.
- .5 Erect metal studding to tolerance of 1:1000.
- .6 Attach studs to tracks using screws.
- .7 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
- .8 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.
- .9 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified. Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.
- .10 Install heavy gauge single jamb studs at openings.

- .11 Erect track at head of door/window openings and sills of 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.
- .12 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.
- .13 Provide 40 mm stud or furring channel secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions.
- .14 Install steel studs or furring channel between studs for attaching electrical and other boxes.
- .15 Extend partitions to ceiling height except where noted otherwise on drawings.
- .16 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs. Use double track slip joint as indicated.
- .17 Install continuous insulating strips to isolate studs from uninsulated surfaces.
- .18 Install two continuous beads of acoustical sealant or insulating strip under studs and tracks around perimeter of sound control partitions.
- .19 Ballistic reinforcing:
 - .1 Install ballistic panels to partition framing from floor to underside of structure with drywall screws at 300 mm o.c.
 - .2 Ensure all joints are located over supporting members and provide full length batten strips at joint.
 - .3 Cut ballistic panels and predrill pilot holes for all fasteners.
 - .4 Provide additional framing as required to secure ballistic reinforcing and maintain security barrier.

3.04 CEILING FRAMING INSTALLATION

- .1 Erect hangers and runner channels for suspended gypsum board ceilings to ASTM C840 except where specified otherwise.
- .2 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .3 Install work level to tolerance of 1:1200.

- .4 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles, and other components.
- .5 Install 19 x 64 mm furring channels parallel to, and at exact locations of steel stud partition header track.
- .6 Furr for gypsum board faced vertical bulkheads within and at termination of ceilings.
- .7 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.
- .8 Install wall furring for gypsum board wall finishes to ASTM C840, except where specified otherwise.
- .9 Furr openings and around built-in equipment, cabinets, access panels, and other components, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.
- .10 Furr duct shafts, beams, columns, pipes and exposed services where indicated.
- .11 Erect drywall resilient furring transversely across studs, spaced maximum 600 mm on centre and not more than 150 mm from ceiling/wall juncture. Secure to each support with 25 mm drywall screw.
- .12 Install 150 mm continuous strip of 12.7 mm gypsum board along base of partitions where resilient furring installed.

3.05 GYP SUM BOARD INSTALLATION

- .1 Do application and finishing of gypsum board to ASTM C840 except where specified otherwise.
- .2 Do application of gypsum sheathing to ASTM C1280.
- .3 Apply gypsum board after bucks, anchors, blocking, sound attenuation, electrical and mechanical work have been approved.
- .4 Apply gypsum board to metal framing using approved fastening system and as follows:
 - .1 Single-Layer Application:
 - .1 Apply gypsum board on ceilings prior to application of walls to ASTM C840.
 - .2 Apply gypsum board vertically or horizontally, providing sheet lengths that will minimize end joints.

- .2 Double-Layer Application:
 - .1 Install gypsum board for base layer and exposed gypsum board for face layer.
 - .2 Apply base layer to ceilings prior to base layer application on walls; apply face layers in same sequence. Offset joints between layers at least 250 mm.
 - .3 Apply base layers at right angles to supports unless otherwise indicated.
 - .4 Apply base layer on walls and face layers vertically with joints of base layer over supports and face layer joints offset at least 250 mm with base layer joints.
 - .5 Apply gypsum board to concrete or concrete block surfaces using laminating adhesive and as follows:
 - .1 Comply with gypsum board manufacturer's recommendations.
 - .2 Brace or fasten gypsum board until fastening adhesive has set.
 - .3 Mechanically fasten gypsum board at top and bottom of each sheet.
 - .6 Apply 12 mm diameter bead of acoustic sealant continuously around periphery of each face of partitioning to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts, and other components, in partitions where perimeter sealed with acoustic sealant.
 - .7 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.
 - .8 Install gypsum board on walls vertically to avoid end-butt joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.
 - .9 Fire rated assembly:
 - .1 Install components in fire rated assemblies in strict accordance with reviewed Shop Drawings and applicable tested and approved designs required by Authorities Having Jurisdiction.
 - .2 Install assemblies tightly to enclosing constructions to maintain integrity of the separations.
 - .10 Install gypsum board with face side out.
 - .11 Ensure new board faces are flush with faces of abutting existing walls and ceilings.
 - .12 Do not install damaged or damp boards.
 - .13 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.
-

3.06 SHAFT WALL SYSTEM

- .1 Secure J track as perimeter framing on floor and plumb to ceiling and sides. Attach with suitable fasteners at maximum 610 mm on centre.
- .2 Place stud layout 610 mm o.c. and adjust spacing at either end to ensure terminal stud is no closer than 203 mm from end.
- .3 Cut shaft wall panels in strict conformance with manufacturers written instructions and plumb first panel flush against long side of J track, securing with 41 mm Type S screws 610 mm o.c. or by bending out tabs in J track to secure panels in place.
- .4 Insert shaft wall stud, cut 19 mm less than overall height, into top and bottom J track and fit tightly over previously installed shaft wall panel.
- .5 Install next shaft wall panel inside J track and within tabs of shaft wall stud.
- .6 Progressively install succeeding studs and panels as described above until wall section is enclosed. Secure final panel section with 41 mm Type S screws or tabs from J track at 610 mm o.c.
- .7 Ensure joints of adjacent panels are alternately stacked or staggered to prevent continuous horizontal joint.
- .8 For doors, ducts or other large penetrations or openings, install J track as perimeter framing.

3.07 ACCESSORIES AND FINISHING

- .1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure using fasteners or adhesive as recommended by manufacturer.
- .2 Install casing beads around perimeter of suspended ceilings.
- .3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.
- .4 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.
- .5 Construct control joints of preformed units or two back-to-back casing beads set in gypsum board facing and supported independently on both sides of joint.

- .6 Provide continuous polyethylene dust barrier behind and across control joints.
- .7 Locate control joints at changes in substrate construction, at approximate 10 m spacing on long corridor runs and at approximate 15 m spacing on ceilings.
- .8 Install control joints straight and true.
- .9 Ensure that screws or nails are properly applied in process of attaching gypsum board to framing without damaging of gypsum board edges and ends.
- .10 Construct expansion joints at building expansion and construction joints. Provide continuous dust barrier.
- .11 Install expansion joint straight and true.
- .12 Splice corners and intersections together and secure to each member with 3 screws.
- .13 Install access doors to electrical and mechanical fixtures specified in respective sections. Rigidly secure frames to furring or framing systems.
- .14 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.
- .15 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with AWCI Levels of Gypsum Board Finish:
 - .1 Level 0: no tapping, finishing or accessories required. Provide for temporary construction.
 - .2 Level 1: embed tape for joints and interior angles in joint compound. Surfaces to be free of excess joint compound; tool marks and ridges are acceptable. Provide in plenum areas above ceilings, in attics or in areas where assembly will be concealed.
 - .3 Level 2: embed tape for joints and interior angles in joint compound and apply one separate coat of joint compound over joints, angles, fastener heads and accessories; surfaces free of excess joint compound; tool marks and ridges are acceptable. Provide where water resistant gypsum backing board is used as tile substrate.
 - .4 Level 3: embed tape for joints and interior angles in joint compound and apply two separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges. Provide in areas to receive heavy or medium coat of textured material, or where heavy grade wall coverings are to be applied.

- .5 Level 4: embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges. Provide where light textures or wall coverings are to be applied.
- .6 Level 5: embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; apply a thin skim coat of joint compound to entire surface; surfaces smooth and free of tool marks and ridges. Provide where gloss, semi-gloss, enamel or non-textural flat paints are specified or where severe lighting conditions occur.
- .16 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
- .17 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.
- .18 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- .19 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.

3.08 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by gypsum board assembly work.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.

1.02 REFERENCES

- .1 AODA - Accessibility for Ontarians with Disabilities Act.
- .2 ANSI A108/A118/A136.1 - Installation of Ceramic Tile, including the following standards:
 - .1 ANSI A108.1 - Installation of Ceramic Tile.
 - .2 ANSI A118.3 - Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive.
 - .3 ANSI A118.4 - Standard Specification for Modified Dry-Set Cement Mortar.
 - .4 ANSI A118.6 - Standard Specifications for Standard Cement Grouts for Tile Installation.
 - .5 ANSI A118.7 - Standard Specifications for High Performance Cement Grouts for Tile Installation.
 - .6 ANSI A136.1 - Organic Adhesives for Installation of Ceramic Tile.
- .3 ANSI A137.1 - Specification for Ceramic Tile.
- .4 ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.
- .5 ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- .6 ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants.
- .7 ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- .8 CSA A3000 - Cementitious Materials Compendium.
- .9 Terrazzo Tile and Marble Association of Canada (TTMAC) - Tile Installation Manual and Maintenance Guide.

1.03 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.

- .2 Product data: Submit manufacturers product data for tile, mortars and grouts, waterproofing, and sealants including product characteristics, performance criteria, and limitations.
- .3 Shop Drawings: Submit Shop Drawings as follows:
 - .1 Shop Drawings to illustrate tile layout and patterns.
 - .2 Indicate perimeter conditions, connections to dissimilar materials and setting details.
- .4 Samples: Submit 300 mm x 300 mm samples illustrating colours, textures and finishes including, but not limited to:
 - .1 300 mm x 300 mm sample panels of each colour, texture, size, and pattern of tile. Adhere tile samples to 12 mm thick plywood and grout joints to represent project installation.
 - .2 Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, colour, and size.

1.04 CLOSEOUT AND MAINTENANCE SUBMITTALS

- .1 Submit closeout and maintenance submittals in accordance with Section 01 78 00.
- .2 Closeout Product data: Submit manufacturers maintenance and cleaning data for incorporation into operation and maintenance manual.
- .3 Maintenance materials: Submit extra 2% or to nearest full carton of each type and colour of tile.

1.05 QUALITY ASSURANCE

- .1 Installers: Perform Work of this Section by a company that has a minimum of five (5) years proven experience in the installation of tile of a similar size and nature. Company shall also be a member of good standing of TTMAC.

1.06 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver materials in adequate crates or containers with manufacturer's name and product description clearly marked.
- .2 Store and handle tiles in manner to avoid chipping, breakage or the introduction of foreign matter.
- .3 Store mortar and grout admixtures in location to protect materials from freezing or from excessive heat.

1.07 SITE CONDITIONS

- .1 Ambient Conditions: Work of this Section shall be performed when air and surface temperatures are between 12 degrees C and 38 degrees C for 48 hours before, during and 48 hours after installation.
- .2 Do not apply epoxy mortar and grouts at substrate temperatures below 15 degrees C or above 25 degrees C.

2 PRODUCTS

2.01 TILE

- .1 Tile:
 - .1 to ANSI A137.1.
 - .2 Provide finished corners and bullnose tiles as required.
 - .3 Basis of Design: Confirm tile selection with Consultant prior to purchasing.
 - .1 PCT1: 600 mm x 600 mm, to match Pinch by Olympia Tile in White colour.
 - .2 PCT2: 300 mm x 600 mm, to match Blend by Olympia Tile in Class colour.
 - .3 PCT3: 75 mm x 300 mm, to match City by Olympia Tile in Cream colour.
 - .4 PCT4: 41 mm x 145 mm hex shape, to match Picket by Olympia Tile in White colour.
 - .5 CT1: 100 mm x 400 mm, to match Colour & Dimension by Olympia Tile in Dark Grey colour, matte finish.

2.02 METAL TRIMS

- .1 Floor transition strips: Refer to Interior Material Finish Schedule.
- .2 Wall edge protection strips (EP1):
 - .1 Stainless steel edge protection strip, continuous at all exposed tile edges, depth as required to suit tile thickness.
 - .2 Finish: Satin.
 - .3 Basis of Design:
 - .1 Proangle by Mapei Inc.
 - .2 Jolly by Schluter Systems.
 - .3 Or approved equal.

2.03 ACCESSORIES

- .1 Levelling Bed Mortar Materials:
 - .1 Cement: to CSA A3000, type GU.
 - .2 Sand: to ASTM C144, passing 16 mesh.

- .3 Latex additive: formulated for use in cement mortar and thin set bond coat.
- .4 Water: potable and free of minerals and chemicals which are detrimental to mortar and grout mixes.
- .2 Latex additive:
 - .1 Thin-set mortar: Single component to ANSI A108/A118/A136.1, provided with white mortar at glass, or light coloured tiles as recommended by tile manufacturer. Basis of Design:
 - .1 Ardex X77 Microtec by Ardex.
 - .2 Versabond LFT by Custom Building Products.
 - .3 254 Platinum by Laticrete International.
 - .4 Ultralite by Mapei Inc.
 - .5 Or approved equal.
 - .2 Medium-bed mortar (large format tile): to ANSI A118.4, provided with white mortar at glass, or light coloured tiles as recommended by tile manufacturer. Basis of Design:
 - .1 ProLite Premium LFT by Custom Building Products.
 - .2 Flextile 56 SR by Flextile Ltd.
 - .3 220 Marble & Granite Thick Bed Adhesive by Laticrete International Inc.
 - .4 Ultraflex LFT by Mapei Inc.
- .3 Organic adhesive: to ANSI A136.1.
- .4 Grout:
 - .1 Cement Grout: to ANSI A118.6. Use one part white cement to one part white sand passing a number 30 screen.
 - .2 Latex Cement Grout: to ANSI A118.7, fast curing, high early strength, polymer-modified, stain resistant, sanded mix for floors, unsanded mix for walls and floors with polished tiles.
 - .3 Epoxy grout: to ANSI A118.3, having quality, colour and characteristics to match epoxy bond coat. Adhesive and grout by same manufacturer.
 - .4 Colours: Refer to Interior Material Finish Schedule.
 - .5 Basis of Design manufacturers:
 - .1 Ardex.
 - .2 Custom Building Products.
 - .3 Flextile Ltd.
 - .4 Laticrete International.
 - .5 Mapei Inc.
- .5 Sealant:
 - .1 Joint backing: to ASTM C1330; Round, solid section, soft polyethylene foam gasket compatible with primer and sealant materials.
 - .2 Primer: for use on porous tile surfaces as recommended by manufacturer.

- .3 Tile sealant at horizontal floor joints: Multi-component polyurethane sealant with self levelling properties to ASTM C920, Type M, Grade P, Class 25. Colours: To be selected by Consultant from standard colour selection. Basis of Design:
 - .1 Commercial 100% Silicone Sealant by Custom Building Products.
 - .2 Mapesil T Plus by Mapei Inc.
 - .3 Vulkem 445SSL by Tremco Ltd.
 - .4 Or approved equal.
- .4 Tile sealant for remainder of work: Refer to Section 07 92 00.
- .6 Cleaner:
 - .1 Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and leveling compounds and elastomeric waterproofing membrane and coat.
 - .2 Material in accordance with TTMAC's requirements and as recommended by tile manufacturer.

2.04 MIXES

- .1 Cement bed for floors:
 - .1 1 part cement, 4 parts sand, 1 part water. Adjust water volume depending on water content of sand. Latex additive as recommended.
 - .2 Measure mortar ingredients by volume.
- .2 Dry set mortar: mix to manufacturer's instructions.
- .3 Organic adhesive: pre-mixed.
- .4 Mix grout to manufacturer's instructions.
- .5 Adjust water volumes to suit water content of sand.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.
- .2 Concrete floors shall be tested to the following standards to ensure compliance with flooring manufacturer's recommendations.
 - .1 Moisture Test: Moisture emissions from concrete subfloors (cured for a minimum of 28 days) to be tested in accordance with ASTM F1869.

3.02 PREPARATION

- .1 Clean and dry surfaces thoroughly. Remove oil, wax, grease, dust, dirt, paint, tar, primers, form release agents, curing compound, and other foreign material from substrate surfaces which may prevent or reduce adhesion.
- .2 Neutralize any trace of strong acids or alkali from the substrate.

3.03 CEMENT LEVELLING BED

- .1 Install cement levelling bed on uneven substrate surfaces. Ensure level and plumb substrates conforming to the following tolerances:
 - .1 Vertical surfaces: 3 mm in 2.4 m maximum.
 - .2 Horizontal surfaces: 6 mm in 3 m from finished levels of the surface, or better.
- .2 Clean structural substrate control joints and blow-clean with compressed air. Fill control joints flush to levelling bed with grout.

3.04 INSTALLATION

- .1 Perform tile work in accordance with TTMAC Tile Installation Manual, except where specified otherwise.
- .2 Apply tile to clean and sound surfaces.
- .3 Fit tile around corners, fitments, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even. Do not split tiles.
- .4 Maximum surface tolerance 1:800.
- .5 Make joints between tile uniform and approximately 1.5 mm wide, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.
- .6 Lay out tiles so perimeter tiles are minimum 1/2 size.
- .7 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .8 Make internal angles square, external angles rounded or bullnosed.
- .9 Use round or bullnose edged tiles at termination of wall tile panels, except where panel abuts projecting surface, differing plane or where wall edge protection strips are provided.
- .10 Install divider strips at junction of tile flooring and dissimilar materials.

- .11 Allow minimum 48 hours after installation of tiles, before grouting.
- .12 Clean installed tile surfaces after installation and grouting has cured.
- .13 Make control joints in accordance with TTMAC guidelines unless indicated otherwise. Make joint width same as tile joints. Fill control joints with sealant in accordance with Section 07 92 00. Keep building expansion joints free of mortar and grout. Control joints to be provided at perimeter walls, fixed objects, room thresholds, changes in directions and in spacing as outlined in TTMAC.

3.05 PROTECTION

- .1 Prevent traffic over tiled areas, and protect tiled assemblies from weather, freezing, and water immersion, in accordance with mortar manufacturers recommendations.
- .2 Prevent direct impact, vibration and heavy hammering on adjacent and opposite walls for 24 hours minimum, after final installation.
- .3 Cover work temporarily with building paper properly lapped and taped at joints until work has been approved by Consultant.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.

1.02 REFERENCES

- .1 ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- .2 ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
- .3 ASTM C645 - Standard Specification for Nonstructural Steel Framing Members.
- .4 ASTM E1264 - Standard Classification for Acoustical Ceiling Products.

1.03 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for ceiling panels and suspension system including product characteristics, performance criteria, and limitations.
- .3 Shop Drawings: Submit Shop Drawings as follows:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Submit reflected ceiling plans for special grid patterns as indicated.
 - .3 Indicate insert and hanger spacing and fastening details, splicing method for main and cross runners, acoustical unit support at ceiling fixture and lateral bracing and accessories.
- .4 Samples: Submit full size samples of the following:
 - .1 One sample of suspension system.
 - .2 One sample of each type ceiling panel/tile.

1.04 CLOSEOUT AND MAINTENANCE SUBMITTALS

- .1 Submit closeout and maintenance submittals in accordance with Section 01 78 00.
- .2 Closeout Product data: Submit manufacturers maintenance and cleaning data for incorporation into operation and maintenance manual.

- .3 Maintenance materials: Submit extra 3% or to nearest full carton of each type of ceiling panel/tile.

1.05 QUALITY ASSURANCE

- .1 Mock-ups:
 - .1 Construct one (1) mock-up of each type of ceiling system in location as directed by Consultant.
 - .2 Mock-up shall be 3 m² and demonstrate installation of typical light fixtures, and other mechanical and electrical fixtures.
 - .3 Mock-up may form part of the Work if accepted by the Consultant.

1.06 SITE CONDITIONS

- .1 Ambient Conditions: Work of this Section shall be performed when air and surface temperatures are above 10 degrees C.
- .2 Work of this Section shall be performed when relative humidity is below 80% and ventilation is adequate to remove excess moisture.

2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- .1 Armstrong World Industries Inc.
- .2 CGC Inc.
- .3 Certainteed Ceilings Canada.
- .4 Rockfon/Chicago Metallic.

2.02 PERFORMANCE CRITERIA

- .1 Design acoustical ceiling system to resist loads and climatic data as indicated, and in accordance with applicable building codes.
- .2 Design ceiling suspension systems in accordance with ASTM C635/C635M and manufacturer's printed directions to provide a maximum deflection of 1/360.
- .3 Design entire suspension system including hanger anchors to not exceed 25% of their ultimate capacity including lighting fixture dead loads.
- .4 Design tile suspension system to support weight of mechanical and electrical items and with required support to allow rotation/relocation of light fixtures. Acoustic panels are not designed to carry weight of mechanical and electrical equipment.

- .5 Design subframing as necessary to accommodate and avoid conflicts and interferences where ducts or equipment prevent regular spacing of hangers.

2.03 ACOUSTICAL CEILING PANELS/TILES

- .1 Acoustic units panels (ACT1):
 - .1 Type: to ASTM E1264; Type A, Form 2.2, Pattern G.
 - .2 Flame spread rating of 25 or less in accordance with CAN/ULC S102.
 - .3 Smoke developed 50 or less in accordance with CAN/ULC S102.
 - .4 Noise Reduction Coefficient (NRC) designation of: 0.85 or better.
 - .5 Light Reflectance (LR) range of: 0.85 to ASTM E1477.
 - .6 Edge type: tegular.
 - .7 Colour: White.
 - .8 Size: 610 mm x 610 mm x 25 mm thick.
 - .9 Basis of Design:
 - .1 Calla by Armstrong Ceilings Canada.
 - .2 Or approved equal.

2.04 SUSPENSION SYSTEM

- .1 Suspension system: non fire rated, two directional exposed tee bar grid system to ASTM C635/C635M. Colour: White. Basis of Design:
 - .1 Suprafine XL by Armstrong World Industries Inc.
 - .2 Centricitee DXT by CGC Inc.
 - .3 EZ Stab Elite Narrow by Certainteed Ceilings Canada.
 - .4 4000 Temptra by Rockfon/Chicago Metallic.
- .2 Basic materials for suspension system:
 - .1 Commercial quality cold rolled steel, zinc coated.
- .3 Exposed tee bar grid components: shop painted satin sheen, white colour. Components die cut. Main tee with double web, rectangular bulb and 25 mm rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection.
- .4 Subframing and carrying channels: ASTM C645, formed from galvanized steel sheet in sizing as required to suit design.
- .5 Hanger wire: galvanized soft annealed steel wire, 3.6 mm diameter for access tile ceilings.
- .6 Hanger inserts: Purpose made.
- .7 Carrying channels: 38 mm x 19 mm channel of galvanized steel.

- .8 Accessories: splices, clips, wire ties, retainers and wall moulding reveal, to complement suspension system components, as recommended by system manufacturer.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.02 SUSPENSION SYSTEM

- .1 Install suspension system in accordance with ASTM C636/C636M and to manufacturers written instructions.
- .2 Erect ceiling suspension system after work above ceiling has been inspected.
- .3 Secure hangers to overhead structure using attachment methods as indicated, ensuring system is independent of walls, pipes, ducts, and metal deck. Provide additional framing, supports and hangers as required to bridge interference items.
- .4 Install hangers spaced at maximum 1200 mm centres and within 150 mm from ends of main tees.
- .5 Lay out centreline of ceiling both ways, to provide balanced borders at room perimeter with border units not less than 50% of standard unit width.
- .6 Install wall moulding to provide correct ceiling height.
- .7 Completed suspension system to support super-imposed loads, such as lighting fixtures, diffusers, grilles and speakers.
- .8 Support at light fixtures and diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .9 Interlock cross member to main runner to provide rigid assembly.
- .10 Ensure finished ceiling system is square with adjoining walls and level within 1:1000.

3.03 ACOUSTIC PANEL/TILE

- .1 Install acoustical panels and tiles in ceiling suspension system.
- .2 Co-ordinate ceiling work with work of other sections such as interior lighting, fire protection communication, and intrusion and detection systems.

3.04 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by acoustical ceiling installation.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.

1.02 REFERENCES

- .1 ASTM F1861 - Standard Specification for Resilient Wall Base.

1.03 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for resilient base and accessories including product characteristics, performance criteria, and limitations.
- .3 Samples: Submit 300 mm long samples illustrating colours, textures and finishes including, but not limited to:
 - .1 Resilient base.

1.04 CLOSEOUT AND MAINTENANCE SUBMITTALS

- .1 Submit closeout and maintenance submittals in accordance with Section 01 78 00.
- .2 Closeout Product data: Submit manufacturers maintenance and cleaning data for incorporation into operation and maintenance manual..
- .3 Maintenance materials: Submit extra 3% or to nearest full roll/carton of each type of resilient base and accessory.

1.05 SITE CONDITIONS

- .1 Ambient Conditions: Work of this Section shall be performed when air and surface temperatures are above 20 degree C for 48 hours before, during and 48 hours after installation.
- .2 Ensure high ventilation rate, with maximum outside air, during installation as follows:
 - .1 Vent directly to outside.
 - .2 Do not let contaminated air recirculate through a district or whole building air distribution system.
 - .3 Maintain extra ventilation for 1 month minimum after building occupation.

2 PRODUCTS

2.01 MATERIALS

- .1 Resilient base: ASTM F1861, continuous, top set base complete with premoulded end stops and external corners as follows:
 - .1 Type: TV - vinyl, 3.0 mm thick.
 - .2 Style: straight.
 - .3 Height: 101.6 mm.
 - .4 Colour: Refer to Interior Material Finish Schedule.
 - .5 Basis of Design:
 - .1 Burkebase by Mannington Commercial.
 - .2 Traditional Wall Base by Tarkett (Johnsonite).
 - .3 Or approved equal.
- .2 Primers and adhesives: Low VOC of types recommended by resilient base and accessory manufacturer for specific material on applicable substrate, above, on or below grade.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.02 PREPARATION

- .1 Prepare for installation in accordance with manufacturer's written recommendations.

3.03 RESILIENT BASE INSTALLATION

- .1 Lay out base to keep number of joints at minimum.
- .2 Clean substrate and ensure compliance with manufacturers written instructions.
- .3 Apply adhesive to back of base.
- .4 Set base against wall and floor surfaces in straight and level manner and roll with small hand roller.
- .5 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.

- .6 Form corners using premoulded corner units for right angle external corners and formed straight base material for external corners of other angles. Provide field-made corners at locations where premoulded cannot be used.

3.04 CLEANING

- .1 Remove excess adhesive from base and wall surfaces using manufacturers recommended methods.
- .2 Clean, seal and wax base surface to flooring manufacturer's printed instructions.

3.05 PROTECTION

- .1 Protect installed products and components from damage during construction

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.

1.02 REFERENCES

- .1 ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- .2 ASTM F1913 - Standard Specification for Vinyl Sheet Floor Covering without Backing.
- .3 ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- .4 ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

1.03 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for resilient sheet flooring including product characteristics, performance criteria, and limitations.
- .3 Samples: Submit samples illustrating colours, textures and finishes including, but not limited to:
 - .1 300 mm x 300 mm each type sheet material.
 - .2 300 mm long of feature strips.

1.04 CLOSEOUT AND MAINTENANCE SUBMITTALS

- .1 Submit closeout and maintenance submittals in accordance with Section 01 78 00.
- .2 Closeout Product data: Submit manufacturers maintenance and cleaning data for incorporation into operation and maintenance manual.
- .3 Maintenance materials: Submit extra 3% or to nearest full roll of each type of sheet flooring.

1.05 SITE CONDITIONS

- .1 Ambient Conditions: Work of this Section shall be performed when air and surface temperatures are above 20 degree C for 48 hours before, during and 48 hours after installation.
- .2 Provide high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to outside. Do not let contaminated air recirculate through district or whole building air distribution system.

2 PRODUCTS

2.01 MATERIALS

- .1 Sheet vinyl (VR1): ASTM F1913, Homogeneous sheet as follows:
 - .1 Thickness: 2 mm.
 - .2 Texture: non-directional pattern.
 - .3 Colour: Quartz 0969.
 - .4 Basis of Design:
 - .1 Melodia by Tarkett.
 - .2 Or approved equal.
- .2 Resilient base: Refer to Section 09 65 13.
- .3 Primers and adhesives: Low VOC of types recommended by resilient flooring manufacturer for specific material on applicable substrate, above, on or below grade and as required to suit test results of concrete subfloor.
- .4 Self-levelling sub-floor filler: Low VOC, self-levelling cement-based underlayment meeting ASTM F710 and providing a cured density of 2 kg/L. Basis of Design:
 - .1 NovoPlan 2 Plus by Mapei.
 - .2 Or approved equal.
- .5 Metal edge strips: Aluminum extruded, smooth, mill finish trim with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.

- .2 Concrete floors shall be tested to the following standards to ensure compliance with flooring manufacturer's adhesive recommendations. Ensure selected adhesive meets substrate's test results.
 - .1 Internal Relative Humidity Test: Humidity tested in accordance with ASTM F2170.
 - .2 Moisture Test: Moisture emissions from concrete subfloors (cured for a minimum of 28 days) to be tested in accordance with ASTM F1869.
 - .3 Subfloor surface pH level. Surfaces with pH over recommended level shall be neutralized.

3.02 PREPARATION

- .1 Remove sub-floor ridges and bumps.
- .2 Apply subfloor filler and leveller to fill low spots, cracks, joints, and other defects to provide a smooth monolithic surface.
- .3 Prime sub-floor to resilient flooring manufacturer's printed instructions.
- .4 Concrete subfloors shall conform to ASTM F710.

3.03 APPLICATION

- .1 Apply adhesive uniformly using recommended trowel. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .2 Lay flooring with seams parallel to building lines to produce a minimum number of seams. Border widths minimum 1/3 width of full material.
- .3 Run sheets in direction of traffic. Double cut sheet joints and continuously seal or heat weld according to manufacturer's printed instructions.
- .4 As installation progresses, and after installation roll flooring with minimum 45 kg minimum roller to ensure full adhesion.
- .5 Cut flooring around fixed objects.
- .6 Continue flooring over areas which will be under built-in furniture.
- .7 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.
- .8 Terminate flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar.

- .9 Install metal edge strips at unprotected or exposed edges where flooring terminates.

3.04 CLEANING

- .1 Five days after installation, clean sheet flooring surfaces with a mild soap solution approved by finish manufacturer. Rinse clean and allow to dry.

3.05 PROTECTION

- .1 Protect new floors from time of final set of adhesive until final inspection.
- .2 Prohibit traffic on floor for 72 hours after installation.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.

1.02 REFERENCES

- .1 ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- .2 CAN/ULC S102 - Surface Burning Characteristics of Building Materials and Assemblies.

1.03 ADMINISTRATIVE REQUIREMENTS

- .1 Site Meetings: Arrange a pre-installation meeting on Site to be attended by Consultant, Contractor, access flooring manufacturer's representative, and any other parties directly affecting work of this Section to:
 - .1 Examine substrate conditions for compliance with manufacturer's requirements.
 - .2 Review methods and procedures related to installation.
 - .3 Review all typical and special details as required to complete the work of this section.

1.04 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for access flooring including product characteristics, performance criteria, and limitations.
- .3 Shop Drawings: Submit Shop Drawings as follows:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Shop Drawings to illustrate details, dimensions, fabrication and installation details.
 - .3 Layout of work complete with edge and fascia details, elevation differences, cutouts, and floor finishes.
 - .4 Anchorage details.
- .4 Samples: Submit samples illustrating colours, textures and finishes including, but not limited to:
 - .1 Full size floor panel.
 - .2 Pedestal.

- .3 Stringer member.
- .4 Fasteners.
- .5 Accessories.
- .5 Reports/certificates: Submit the following:
 - .1 Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
 - .2 Certificates: submit certification, to demonstrate compliance of access flooring system to specification as follows:
 - .1 CSA or ULC certification.
 - .2 Independent testing agency test reports certifying that product meets standard.

1.05 CLOSEOUT AND MAINTENANCE SUBMITTALS

- .1 Submit closeout and maintenance submittals in accordance with Section 01 78 00.
- .2 Closeout Product data: Submit manufacturers maintenance and cleaning data for incorporation into operation and maintenance manual including product warranty documentation.
- .3 Maintenance materials: Submit extra 10 spare pedestals, and 10 spare floor panels for each type of floor covering.

1.06 QUALITY ASSURANCE

- .1 Installers: Perform Work of this Section by a company that has a minimum of five (5) years proven experience in the installation of access flooring of a similar size and nature.
- .2 Mock-ups:
 - .1 Construct one (1) mock-up of each type of access flooring system in location as directed by Consultant.
 - .2 Mock-up shall be 5 m² and demonstrate securement of pedestals and floor panels.
 - .3 Mock-up may form part of the Work if accepted by the Consultant.

1.07 DELIVERY, STORAGE, AND HANDLING

- .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect access flooring from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.

1.08 WARRANTY

- .1 Provide extended warranty for access flooring in accordance with the General Conditions, except warranty is extended to three (3) years from date Ready-for-Takeover has been attained:
 - .1 Warranty to cover defects including pedestal failure, and finish failure.
 - .2 Warranty shall cover complete replacement of Work, including adjacent work impacted.

2 PRODUCTS

2.01 SYSTEMS AND MANUFACTURERS

- .1 TecCrete by Global Integrated Flooring Solutions
- .2 ConCore System by Tate Inc.
- .3 Or approved equal.

2.02 PERFORMANCE CRITERIA

- .1 Design access flooring to resist loads and climatic data as indicated, and in accordance with applicable building codes.
- .2 Pedestals: pedestal assembly to support a concentrated load of 22 kN without going out of alignment.
 - .1 Pedestals, when secured to subfloor, to resist a 113 N*m force applied horizontally at top of pedestal.
 - .2 Ultimate load carrying capacity: not less than twice design strength.
- .3 Stringers:
 - .1 Assembly to remain completely braced and rigid after a maximum of eight abutting panels are removed.
 - .2 Stringers to support a mid-span force of 0.66 kN minimum.
- .4 Floor Panels:
 - .1 Uniformly distributed load of 28 kPa minimum: maximum deflection of 1 mm.
 - .2 Concentrated load of 5.5 kN applied over area of 25 x 25 mm at any location: maximum deflection of 2.54 mm.
 - .3 Rolling load of 5.8 kN on 76 mm diameter caster with bearing area of 1.27 mm² anywhere on panel without damage maximum deflection of 2.54 mm.
 - .4 Permanent deflection: 0.5 mm maximum at design load.
 - .5 Ultimate strength of the panel: provide safety factor of 3.0 times its design load without failure.

- .5 Allowable Tolerances:
 - .1 Flatness of floor panels: 0.8 mm or less in any direction.
 - .2 Surface Dimension: 0.4 mm or less of all panels.
 - .3 Finished floor level tolerance: plus or minus 3 mm for overall floor, and plus or minus 2 mm in 3000 mm in any direction.
 - .4 Squareness: plus or minus 0.5 mm in surface dimension.
- .6 Fire Resistance: Floor panels, less finished flooring: to meet Class A in accordance with ASTM E84 with flame spread rating of 25; smoke development of 50 to CAN/ULC S102.
- .7 Electrical Resistance: From surface of floor covering through to understructure shall not exceed 10 ohms or less.

2.03 MATERIALS

- .1 Floor Panels: Panels shall be integrated steel pan construction with exposed top surface of lightweight concrete fill and cornerlocked.
 - .1 Panels shall be 610 mm x 610 mm, manufactured with galvanized steel pan with shear tabs integrally bonded to lightweight, high-strength concrete fill. Each panel shall accept flush-fit metal fastener to securely fasten each panel corner to pedestal head.
 - .2 Panel Finish: Floor panel surface shall be factory standard bare concrete to accept field installed finish.
 - .1 Resilient sheet flooring: In accordance with Section 09 65 16.
- .2 Understructure:
 - .1 Pedestal assemblies shall be of hot-dip galvanized steel with minimum 103 cm² bearing area and designed to be adhered to subfloor.
 - .2 Provide 19 mm diameter threaded stud fabricated from steel.
 - .3 Design head assembly to hold panels in place with or without cornerlock fasteners.
 - .4 Pedestal assembly shall provide an adjustment range of +/- 25 mm when finished floor height is 150 mm or more, adjustable at 0.4 mm increments.
 - .5 Assembly shall provide mechanical means of locking floor in a level plane while allowing adjustments without special tools.

2.04 ACCESSORIES

- .1 Accessories: Furnish lateral bracing, fascia, cutouts and miscellaneous items where indicated.
- .2 Adhesives: type as recommended by manufacturer of material to be bonded.

- .3 Panel lifting device: Manufacturer's standard equipment, type recommended for each panel type.
- .4 Electrical and communication service outlets: manufacturer's standard, CSA approved, electrical box complete with hinged lid, two duplex receptacles and communication plate designed to fit flush in access floor panel.
- .5 Cable cutout protection: extruded polyvinyl chloride or neoprene edging.
- .6 Access grommets: textured plastic, sized to suit power and communication outlets colour to be selected by Consultant.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.02 PREPARATION

- .1 Ensure subfloor is sufficiently level so finished elevated floor is level within tolerance specified without exceeding adjusting capacity of pedestals.
- .2 Examine area to receive access flooring and ensure area is square. Where area is out of square, lay out work to ensure perimeter panels are cut to fit and follow configuration of abutting vertical surface. Using strips of access floor to fill gaps will not be accepted.

3.03 INSTALLATION

- .1 Install components in accordance with system manufacturer's written recommendations.
- .2 Pedestals and stringers:
 - .1 Arrange pedestal assemblies to meet grid spacing required.
 - .2 Bond pedestals base plate to structural floor with adhesive.
 - .3 Install additional pedestal assemblies where grid pattern is disturbed by columns, walls, ramps, openings, and steps, and at cut-outs that impair floor load capacity.
 - .4 Install stringers rigidly brace floor pedestals four ways.
- .3 Floor panels:
 - .1 Install floor panels and floor finish solidly on pedestals, level to maximum variation over entire floor of 1:2000.

- .2 Seal field cuts with plastic angles or channels. No exposed cut edges permitted.
- .3 Allow for cutting holes in floor panels for installation of computer equipment and air conditioning units. Include cable protection edging or sheet.
- .4 Provide floor, complete with necessary edge trims, end closures and lateral bracing at step edges and other locations where pedestal is not braced four ways.
- .4 Fascia panels:
 - .1 Install fascia panels at exposed sides and step risers.
 - .2 Secure panels to continuous angles mechanically secured to structural floor and to edge of floor panels.
 - .3 Install metal trim at intersection of fascia panels and access floor and at abutting walls and columns.
- .5 Adjust floor panel system for smooth, quiet operation.

3.04 CLEANING

- .1 Clean surfaces after installation using manufacturer's recommended cleaning procedures.
- .2 Clean aluminum with damp rag and approved non-abrasive cleaner.

3.05 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Protect finished access floor with kraft paper, sealed at edges to prevent tearing.
- .3 Repair damage to adjacent materials caused by access flooring installation.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.
- .2 Work may include, but is not limited to;
 - .1 Impact resistant decorative laminate panels.

1.02 REFERENCES

- .1 ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.03 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for rigid sheet wall coverings including product characteristics, performance criteria, and limitations.
- .3 Samples: Submit 300 mm x 300 mm samples illustrating colours and textures of each type rigid sheet wall coverings.
- .4 Reports/certificates: Submit the following:
 - .1 Submit certification that rigid sheet wall covering meet requirements of Fire Hazard Ratings of the Building Code.

1.04 CLOSEOUT AND MAINTENANCE SUBMITTALS

- .1 Submit closeout and maintenance submittals in accordance with Section 01 78 00.
- .2 Closeout Product data: Submit manufacturers maintenance and cleaning data for incorporation into operation and maintenance manual.
- .3 Maintenance materials: Submit extra 3% or to nearest full roll of each type of wall covering.

1.05 QUALITY ASSURANCE

- .1 Mock-ups:
 - .1 Construct one (1) mock-up of each type of rigid sheet wall covering in location as directed by Consultant.
 - .2 Mock-up shall be 2 m² and demonstrate use of trims and accessories, and treatment of material edges and transitions.

- .3 Mock-up may form part of the Work if accepted by the Consultant.

1.06 SITE CONDITIONS

- .1 Ambient Conditions: Work of this Section shall be performed when air and surface temperatures are above 15 degree C and a relative humidity below 45% for 24 hours before, during and 24 hours after installation.
- .2 Provide high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to outside. Do not let contaminated air recirculate through district or whole building air distribution system.

2 PRODUCTS

2.01 MATERIALS

- .1 Rigid Sheet wall covering:
 - .1 Core: Treated fibreglass core.
 - .2 Surface burning characteristics: Class A to ASTM E84.
 - .3 Finish: Grade H1 laminate minimum 1.7 mm thick. Colour: Refer to Interior Material Finish Schedule.
 - .4 Basis of Design:
 - .1 Hardstop Decorative Panels by Formica.
 - .2 Or approved equal.
- .2 Accessories and trims: 1.4 mm thick aluminum trim in colour and finish as selected by Consultant.
- .3 Adhesive: Low VOC of types recommended by wall covering manufacturer for specific application.
- .4 Seam filler: Colour coordinated 100% silicone seam filler.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.02 PREPARATION

- .1 Prepare surfaces according to covering manufacturer's instructions and to remove dust, debris and loose particles.

- .2 Ensure gypsum board partitions are finished to a Level 3 finish. Previously painted surfaces to be sanded.

3.03 APPLICATION

- .1 Install rigid sheet wall covering in accordance with reviewed Shop Drawings and manufacturer's written instructions.
- .2 Dry lay panels over gypsum board partitions ensuring joints are not positioned over gypsum board. Apply adhesive and position panels ensuring a balanced appearance leaving 3 mm gap between trims or intersecting obstructions and panel.
- .3 Ensure all panel edges are covered with trim or seam filler.
- .4 Check all edges are clean and free of adhesive.

3.04 CLEANING

- .1 Remove panel protective film and clean rigid sheet wall covering to manufacturers written instructions.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.
- .2 Work may include, but is not limited to;
 - .1 Interior painting.
 - .2 Exterior painting.

1.02 REFERENCES

- .1 Master Painters Institute (MPI) - Architectural Painting Specification Manual.

1.03 ADMINISTRATIVE REQUIREMENTS

- .1 Scheduling:
 - .1 Submit work schedule for various stages of painting to Consultant for approval. Submit schedule minimum of 48 hours in advance of proposed operations.
 - .2 Schedule painting operations to prevent disruption of occupants in and about the building.

1.04 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for paint and coating materials including product characteristics, performance criteria, and limitations including:
 - .1 Manufacturer's Product names, types, codes and names.
 - .2 Number of coats, and dry film thicknesses.
 - .3 Submit listing minimum of 8 weeks before materials are required with Product data listed for each required Painting Schedule code.
- .3 Samples: Submit 300 mm x 300 mm samples of each paint, stain and coating type illustrating colours, gloss/sheen and textures.
- .4 Reports/certificates: Submit the following:
 - .1 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
 - .2 Submit documentation confirming each worker has Qualification Certificate of Proficiency.

1.05 CLOSEOUT AND MAINTENANCE SUBMITTALS

- .1 Submit closeout and maintenance submittals in accordance with Section 01 78 00.
- .2 Closeout Product data: Submit manufacturers maintenance and cleaning data for incorporation into operation and maintenance manual.
- .3 Maintenance materials: Submit extra 3% or to nearest full L can of each type and colour of paint.

1.06 QUALITY ASSURANCE

- .1 Installers: Perform Work of this Section by a company that has a minimum of five (5) years proven experience in the application of paint and coating systems of a similar size and nature.
- .2 Qualified journeymen who have a "Tradesman Qualification Certificate of Proficiency" shall be engaged in painting work. Apprentices may be employed provided they work under the direct supervision of a qualified journeyman in accordance with trade regulations.
- .3 Conform to latest MPI requirements for painting work including preparation and priming.
- .4 Materials: in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.
- .5 Mock-ups:
 - .1 Construct one (1) mock-up of each type of paint schedule code material in location as directed by Consultant.
 - .2 Mock-up shall be 3 m² and demonstrate gloss/sheen, textures, workmanship, and coverage/hiding power of finish.
 - .3 Mock-up may form part of the Work if accepted by the Consultant.

1.07 DELIVERY, STORAGE, AND HANDLING

- .1 Store materials and equipment in well ventilated area with temperature range 7 degrees C to 30 degrees C. Ensure materials and supplies are kept away from heat generating devices.
- .2 Keep areas used for storage, cleaning and preparation, clean and orderly. After completion of operations, return areas to clean condition.
- .3 Remove paint materials from storage only in quantities required for same day use.

- .4 Provide one 9 kg Type ABC fire extinguisher adjacent to storage area. Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis. Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada (NFC).

1.08 SITE CONDITIONS

- .1 Ambient Conditions: Work of this Section shall be performed when air and surface temperatures are between 10 degrees C and 32 degrees C. Maintain temperature conditions for 24 hours before, during and 24 hours after painting.
- .2 Ensure relative humidity is below 85%.
- .3 Ensure no rain or snow are forecast to occur before paint has thoroughly cured. Do not apply paint when it is foggy, misty, raining or snowing at site.
- .4 Provide minimum lighting level of 323 Lux on surfaces to be painted.
- .5 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
- .6 Do not apply paint when:
 - .1 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.
 - .2 Surface to be painted is wet, damp or frosted.
- .7 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.
- .8 Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.
- .9 Apply paint in occupied facilities during silent hours only. Schedule operations to approval of Consultant such that painted surfaces will have dried and cured sufficiently before occupants are affected.

2 PRODUCTS

2.01 MANUFACTURERS

- .1 AkzoNobel (Dulux).

- .2 Benjamin Moore and Co. Ltd.
- .3 PPG Industries Inc.
- .4 Sherwin-Williams Company.

2.02 PERFORMANCE CRITERIA

- .1 Environmental Performance Requirements:
 - .1 Provide paint products meeting MPI "Environmentally Friendly" E2 ratings based on VOC (EPA Method 24) content levels.
 - .2 Green Performance in accordance with MPI Standard GPS-1.

2.03 MATERIALS

- .1 Only paint materials listed in latest edition of MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Paint materials for paint systems: to be products of single manufacturer.

2.04 COLOUR SCHEDULE

- .1 Refer to Following for general Colour References:
 - .1 PT1: to match DLX1001-1 Delicate White by Dulux.
 - .2 PT2: to match DLX1011-1 Pacific Pearl by Dulux.
 - .3 PT2x: to match DLX1009-3 Solitary State by Dulux.
 - .4 PT3: to match DLX1009-7 Licorice by Dulux.
 - .5 PT3x: to match DLX1009-5 Phoenix Fossil by Dulux.
 - .6 PT4: to match DLX1009-7 Licorice by Dulux.
 - .7 PT5: to match DLX1011-7 Onyx by Dulux.
 - .8 PT6: to match SSY-10 Safety Yellow by Dulux.
 - .9 PT7: to match Black UC136909 by Oldcastle.
 - .10 PT8: to match Black UC136909 by Oldcastle.
- .2 Selection of colours to be confirmed with Consultant prior to purchasing.
- .3 Where specific products are available in restricted range of colours, selection will be based on limited range.
- .4 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats if requested by Consultant.
- .5 Perform colour tinting operations prior to delivery of paint to site.
- .6 For deep and ultra deep colours 4 coats may be required.

2.05 GLOSS/SHEEN RATINGS

- .1 Paint gloss: defined as sheen rating of applied paint, in accordance with following values:

Gloss Level Category	Units @ 60 Degrees	Units @ 85 Degrees
G1 - matte finish	0 to 5	max. 10
G2 - velvet finish	0 to 10	10 to 35
G3 - eggshell finish	10 to 25	10 to 35
G4 - satin finish	20 to 35	min. 35
G5 - semi-gloss finish	35 to 70	
G6 - gloss finish	70 to 85	
G7 - high gloss finish	> 85	

- .2 Gloss level ratings of painted surfaces as noted on Finish Schedule.

2.06 EXTERIOR PAINTING SYSTEMS

- .1 Concrete Vertical Surfaces: (including horizontal soffits):
.1 EXT 3.1A - Latex (over alkali-resistant primer) finish.
- .2 Concrete Masonry Units: smooth and split face block and brick:
.1 EXT 4.2H - Water repellent (non-paintable) finish not for use on lightweight concrete block.
- .3 Structural Steel and Metal Fabrications:
.1 EXT 5.1L - Polyurethane, Pigmented finish (over inorganic zinc primer and h.b. epoxy).
- .4 Galvanized Metal: not chromate passivated:
.1 EXT 5.3L - Polyurethane, Pigmented (over epoxy primer) high contact/traffic. For use at hollow metal doors and frames.

2.07 INTERIOR PAINTING SYSTEMS

- .1 Concrete Vertical Surfaces: including horizontal soffits:
.1 INT 3.1A Latex finish (over sealer).
- .2 Structural Steel and Metal Fabrications: columns, beams, joists, steel stairs, etc.:
.1 INT 5.1R High performance architectural latex finish.

- .3 Galvanized Metal: doors, frames, railings, misc. steel, pipes, overhead decking, ducts, etc.:
 - .1 INT 5.3A Latex finish. For use at ducts, pipes, metal deck.
 - .2 INT 5.3M High performance architectural latex finish. For use on hollow metal doors and frames.
- .4 Plaster and Gypsum Board: gypsum wallboard, drywall, "sheet rock type material", etc., and textured finishes:
 - .1 INT 9.2B High performance architectural latex finish.
 - .2 INT 9.2F Waterborne epoxy (tile-like) finish. For use in wet/damp areas.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.
- .2 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .3 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple "cover patch test". Perform no painting work when maximum moisture content of substrate exceeds:
 - .1 12% for concrete and masonry (clay and concrete brick/block).
 - .2 15% for hard wood.
 - .3 17% for soft wood.
 - .4 12% for plaster and gypsum board.

3.02 PROTECTION

- .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces as directed by Consultant.
- .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .3 Protect factory finished products and equipment.
- .4 Protect passing pedestrians, building occupants and general public in and about the building.

- .5 Removal of electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings shall be done prior to undertaking any painting operations by General Contractor. Items shall be securely stored and re-installed after painting is completed by General Contractor.
- .6 As painting operations progress, place "WET PAINT" signs in occupied areas and restrict or prevent traffic as necessary.

3.03 PREPARATION

- .1 Clean and prepare surfaces in accordance with MPI Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths.
 - .2 Wash surfaces with a biodegradable detergent [and bleach where applicable] and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
 - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .4 Allow surfaces to drain completely and allow to dry thoroughly.
 - .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
 - .6 Use trigger operated spray nozzles for water hoses.
 - .7 Many water-based paints cannot be removed with water once dried. However, minimize the use of kerosene or any such organic solvents to clean up water-based paints.
- .2 Clean existing cementitious and masonry surfaces with high pressure water washing.
- .3 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .4 Where possible, prime surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
 - .1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
 - .2 Apply wood filler to nail holes and cracks.
 - .3 Tint filler to match stains for stained woodwork.
- .5 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

- .6 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements.
- .7 Touch up of shop primers with primer as specified in applicable section. Major touch-up including cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas, shall be by supplier of fabricated material.

3.04 APPLICATION

- .1 Perform preparation and operations for painting in accordance with MPI Painting Specifications Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.
- .3 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
- .4 Apply paint to adequately prepared surfaces and to surfaces within moisture limits noted herein.
- .5 Apply paint when previous coat of paint is dry or adequately cured.
- .6 Apply coats of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .7 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .8 Sand and dust between coats to remove visible defects.
- .9 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .10 Finish closets and alcoves as specified for adjoining rooms.
- .11 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.
- .12 Mechanical/Electrical Equipment:
 - .1 Coordinate painting of mechanical and electrical components with Divisions 21, 22, 23 and 26.

- .2 Paint conduits, piping, hangers, ductwork and other mechanical and electrical equipment exposed in finished areas, to match adjacent surfaces, except as indicated.
- .3 Do not paint over nameplates.
- .4 Keep sprinkler heads free of paint.
- .5 Paint both sides and edges of backboards for telephone and electrical equipment before installation.
- .6 Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

3.05 SITE QUALITY CONTROL

- .1 Painted surfaces to be inspected as required. Cooperate with inspection firm and provide access to areas of work.
- .2 Standard of Acceptance:
 - .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
 - .2 Ceilings/Soffits: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.
 - .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.
- .3 Defects include, but are not limited to;
 - .1 Improper cleaning and preparation of surfaces.
 - .2 Entrapped dust, dirt, rust.
 - .3 Alligatoring, blisters, peeling.
 - .4 Scratches, blemishes.
 - .5 Uneven coverage, misses, drips, runs, and poor cutting in.

3.06 CLEANING AND RESTORATION

- .1 Clean and re-install all hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

3.07 PROTECTION

- .1 Protect freshly completed surfaces from paint droppings and dust to approval of Consultant. Avoid scuffing newly applied paint.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.

1.02 REFERENCES

- .1 ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip.
- .2 ASTM F2285, Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use.
- .3 CSA B651 - Accessible Design for the Built Environment.

1.03 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for washroom accessories including product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings: Submit Shop Drawings to illustrate:
 - .1 Size and description of components, base material, surface finish inside and out, hardware and locks,
 - .2 Attachment devices, description of rough-in-frame, and building-in details of anchors for grab bars.

1.04 CLOSEOUT AND MAINTENANCE SUBMITTALS

- .1 Submit closeout and maintenance submittals in accordance with Section 01 78 00.
- .2 Closeout Product data: Submit manufacturers maintenance and cleaning data for incorporation into operation and maintenance manual including product warranty documentation.
- .3 Maintenance materials: Submit special tools required for assembly, disassembly, or removal of washroom accessories.

1.05 DELIVERY, STORAGE, AND HANDLING

- .1 Pack, brace or crate products as required to prevent distortion in shipment and handling. All packages and crates to be labelled.

2 PRODUCTS

2.01 MANUFACTURERS

- .1 ASI Group Canada.
- .2 Bobrick Washroom Equipment Inc.
- .3 Or approved equivalent.

2.02 MATERIALS

- .1 Stainless steel sheet metal: to ASTM A480/A480M, Type 304, with finish as noted.
- .2 Stainless steel tubing: Type 304, commercial grade, seamless welded, 1.2 mm wall thickness.
- .3 Fasteners: Concealed screws and bolts hot dip galvanized, exposed fasteners to match face of unit. Expansion shields fibre, lead or rubber as recommended by accessory manufacturer for component and its intended use.

2.03 COMPONENTS

- .1 Accessories noted on the Plumbing Fixture Schedule are provided as a basis of design. Approved equivalents may be considered provided they are approved prior to purchase.

2.04 FABRICATION

- .1 Weld and grind joints of fabricated components flush and smooth. Use mechanical fasteners only where approved.
- .2 Wherever possible form exposed surfaces from one sheet of stock, free of joints.
- .3 Brake form sheet metal work with 1.5 mm radius bends.
- .4 Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- .5 Shop assemble components and package complete with anchors and fittings.
- .6 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.

- .7 Provide steel anchor plates and components for installation on studding and building framing.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.02 INSTALLATION

- .1 Install washroom accessories in accordance with manufacturer's instructions, CSA B651 and reviewed Shop Drawings. Units to be installed rigid, straight, plumb, and level.
- .2 Install grab bars to built-in anchors provided by bar manufacturer. Installed grab bars to withstand minimum load of 1.3 kN applied in any direction to CSA B651.
- .3 Use tamper proof screws/bolts for fasteners.
- .4 Adjust washroom accessories components and systems for correct function and operation.
- .5 Lubricate moving parts to operate smoothly and fit accurately.
- .6 Fill units with necessary supplies shortly before final acceptance of building.

3.03 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by washroom accessory installation.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section includes all methods, materials and installation as required to complete the Work of this Section in accordance with the Conditions of the Contract.
- .2 Work may include, but is not limited to;
 - .1 Safety treads.
 - .2 Tactile warning plates.

1.02 ACTION SUBMITTALS

- .1 Submit action submittals in accordance with Section 01 33 00.
- .2 Product data: Submit manufacturers product data for each specified Product including product characteristics, performance criteria, and limitations.
- .3 Shop Drawings: Submit Shop Drawings as follows:
 - .1 Shop Drawings to illustrate details, dimensions, materials, gauges, and finishes.

1.03 CLOSEOUT AND MAINTENANCE SUBMITTALS

- .1 Submit closeout and maintenance submittals in accordance with Section 01 78 00.
- .2 Closeout Product data: Submit manufacturers maintenance and cleaning data for incorporation into operation and maintenance manual.

1.04 DELIVERY, STORAGE, AND HANDLING

- .1 Pack, brace or crate products as required to prevent distortion in shipment and handling. All packages and crates to be labelled.

2 PRODUCTS

2.01 MANUFACTURED UNITS

- .1 Safety treads (SN1): Prefabricated, cast-in-place stair nosing:
 - .1 Frame: Nosing base to be fabricated from 6063-T5 extruded aluminum with anchor.
 - .2 Anti-slip filler: Anti-slip material to be integrally bonded to frame and consist of aluminum oxide abrasive or silicon carbide material.
 - .3 Colour: Safety Yellow SSY-10.

- .4 Basis of Design:
 - .1 WP-RN2-SP Cast-in-Place Stair Nosing by Wooster Products Inc.
 - .2 Or approved equal.
- .2 Tactile warning indicators (TWS):
 - .1 Warning indicators pins conforming to ASTM C1028.
 - .2 Pins to be 22 mm diameter Type 316 stainless steel.
 - .3 Basis of Design: UAS-SS2218 by Urban Access Solutions or approved equal.

3 EXECUTION

3.01 EXAMINATION

- .1 Examine and verify previously installed Work upon which this Section depends. Report defects or unsatisfactory conditions to Consultant. Commencement of work of this Section means acceptance of existing conditions.

3.02 INSTALLATION

- .1 Install manufactured units in accordance with manufacturer's instructions, rigid and secure and to reviewed Shop Drawings.
- .2 Place cast-in safety treads into concrete prior to initial set of concrete and tamp nosing to provide complete concrete formation around anchors.
- .3 Tactile warning indicators:
 - .1 Provide tactile walking surface indicators at top and bottom of exterior stairs, where indicated on drawings and in accordance with local municipal bi-laws.
 - .2 Drill holes following manufacturers template, a minimum 20 mm deep. Clean surface ensuring removal of debris from drilled holes.
 - .3 Apply epoxy to stem of indicator and place into drilled hole ensuring indicator is seated securely.
 - .4 Prevent traffic over area until epoxy is cured.
- .4 Adjust and clean manufactured units after installation in accordance with manufacturer's written instructions.

3.03 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by installation of manufactured units.

END OF SECTION
