WATERDOWN DISTRICT HIGH SCHOOL MAIN ENTRANCE AND FOYER RENOVATIONS

215 Parkside Drive, Waterdown, ON. L8B 1B9

FOR

HWDSB

General Requirements and Architectural Specifications Issued for Tender

ward99 architects inc.
Prime Consultant

GENERAL REQUIREMENTS AND ARCHITECTURAL SPECIFICATIONS

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

Refer to HWDSB RFT Documents.

Section 00 31 00 – Available Project Information; Appendix A – Construction School Specific Information

DIVISION 01 - GENERAL REQUIREMENTS

Not used.

DIVISION 12 - FURNISHINGS

Not used.

Refer to Mechanical Drawings for Mechanical Specifications.

Refer to Electrical Drawings for Electrical Specifications.

COMPANY: SEAL

COMPANY: ARCHTECTURAL

ward99 architects inc.

I reviewed and take responsibility for the design work on behalf of a firm registered under subsection 1.2.2.1 of the Ontario Building Code.

LIST OF DRAWINGS

ARCHITECTURAL: WARD99 ARCHITECTS INC.

A0.01 PROJECT TITLE, LIST OF DRAWINGS AND PROJECT INFORMATION
A0.02 SITE MOBILIZATION PLAN AND NOTES
A0.03 EXISTING GROUND FLOOR KEY PLAN
A1.01 DEMOLITION PLANS, NOTES AND LEGENDS
A1.02 PROPOSED GROUND FLOOR PLAN AND PROPOSED REFLECTED CEILING PLAN, NOTES AND LEGEND
A3.01 BUILDING SECTION AND STAIR DETAILS
A3.02 ELEVATIONS AND DETAILS
A5.01 DOOR AND HARDWARE SCHEDULE, ELEVATIONS AND DETAILS AND ROOM FINISHES SCHEDULE

MECHANICAL: SURI AND ASSOCIATES LTD.

M1 MECHANICAL LEGEND, SCHEDULES & KEY PLANS
M2 MECHANICAL LAYOUTS

ELECTRICAL: SURI AND ASSOCIATES LTD.

E1 ELECTRICAL LEGEND & KEY PLANS
E2 ELECTRICAL LAYOUTS

1.1 GENERAL

.1 The documents listed below are enclosed in the Specifications as supplementary information.

.2 Supplementary information is made available to assist the Contractor in the preparation of their bid and does not form part of the Contract Documents for this project.

1.2 School Specific Information

.1 Appendix A – Construction School Specific Information Sheet Sample

END OF SECTION

Appendix A – Construction School Specific Information Sheet Sample

In addition to the terms and conditions of the Contract Documents, the Contractor shall follow the protocols of the Construction Site Specific Information Sheet, sample provided below.
A completed version of this document, with site specific content, will be provided to the Contractor at the pre-construction meeting.

HWDSB

Capital Projects
Facility Services

Construction School Specific Information Sheet

1. School Information:

School Name:	Insert School Name
Bell Times	
Morning (School Entry)**:**	0:00 AM
Afternoon (School Dismissal):	0:00 PM
Aftercare Program Dismissal:	6:00 PM
Caretaking Phone Number:	000-000-0000
***After-Hours Emergency Number:**	905-667-3079
****Caretaking Hours**	
September to June	6:00 AM – 10:00 PM
December Holiday Break	6:00 AM – 2:00 PM
March Break	6:00 AM – 2:00 PM
July to August	6:00 AM – 2:00 PM
Saturday / Sunday	CLOSED
Account Code:	HP0000
Security Panel Code:	0000

*Please call the After-Hours Emergency Number noted above if issues arise outside of Caretaking Hours. These would include unanticipated interruption of services, issues with building or room access, fire alarm or security concerns, etc.

**Caretaker hours are not guaranteed. Please confirm with the HWDSB project supervisor prior to any work taking place, and then on a weekly basis throughout the duration of the project.

2. School Entry for afterhours, school holidays or closures:

Please follow these steps upon entry to the building outside of caretaker hours and on school holidays or closures:

1. Call API Alarm Inc. at 1-877-787-5237 and notify them in advance of the day(s) and time(s) that access to the building will be required. They will require the HP code noted above.
2. Disarm the security panel when arriving.
3. Arm the security panel when leaving.
4. Call API to verify that the building is armed and secure.

Failure to follow this procedure outside of caretaker hours and on school holidays or closures will result in an automatic dispatch of a security guard to the building to verify who has entered/exited the building. Security costs associated with the dispatch of a security guard for failing to follow the procedure will be expensed to the contractor responsible for the incident.

3. Protocol for Work Impacting Fire Alarm System or Devices

The contractor is to follow this procedure when the fire alarm system is impacted.

A. References and Definitions:

Fire Alarm Control and Testing Service Provider: Hamilton Fire Control

Fire Alarm and Security System Monitoring Service Provider: API Alarm Inc.

Fire Watch: An hourly patrol of areas that are not protected/monitored by the fire alarm system. These include but are not limited to, a disconnected device, a covered device, a bypassed device, or device in trouble. The general contractor is responsible for fire watch in all construction areas. Caretaking staff are responsible for fire watch in all other areas of the school. Fire watch is to be recorded in a Fire Watch Log.

Fire Watch Log: The general contractor is to document and maintain a written log confirming fire watch has been conducted hourly. This log is to remain on site for the duration of the project. This written log is maintained separate from the caretaking fire watch log. The caretaking log is digitally recorded within the Boards asset management system (eBase).

B. Mandatory Pre-Construction Site Meeting with Hamilton Fire Control

1. Contractor to request a meeting prior to mobilization with Michael Fleet from Hamilton Fire Control (HFC), the project supervisor from HWDSB, the facility operation supervisor from HWDSB and the head caretaker to review any work that will affect the fire alarm system. This can be coordinated by the project supervisor upon request.

   Contact: Michael Fleet - Hamilton Fire Control
   Phone: (905) 527-7042
   Email: michael@hamiltonfirecontrol.ca

2. Contractor to minute the meeting and submit to the project supervisor and Michael Fleet from HFC for review within 48 hours of the site-walk-through.

C. Mandatory Construction Protocol if the Fire Alarm System is Impacted

1. Contractor to follow procedures discussed and documented from the pre-construction site meeting with Hamilton Fire Control.

2. If devices are impacted during occupied hours:
   - Per the Fire Safety Plan, contractor to notify API that they'll be on Fire Watch (in the area of the impacted devices only). API will not take any action; the notification is for information purposes only.
   - Contractor to either take the device offline or protect/cover it. Fire watch (in the area of the impacted device only) is required in either of these scenarios. If the alarm goes off during work, all occupants, including contractors, are to evacuate the building and the fire department will be dispatched.

   If hot work is taking place, prior to the above-noted steps:
   - Contractors are required to advise HWDSB at least 24 hours before any hot work is scheduled to take place.
   - The contractor is required to provide a hot work permit to HWDSB at the same time.

3. If devices are impacted outside of occupied hours, and the contractor is the only party in the building:
   - The same protocol above is to be followed.

4. If the system or specific devices will not be operational while the school is completely vacant (i.e. overnight or on a weekend when no Work is taking place):
   - No action required.

The system is not to be bypassed (device(s) or full system). The system is NOT to be put on test. The only time the system will be put on test and the school will be on Fire Watch is if the system is being tested.

In the event a fire alarm device is activated, all occupants of the school, including contractors, must evacuate the school. The fire department will be dispatched. The contractor will be responsible for all fire department costs resulting from construction.

4. Please follow these steps for planning any service (electrical, gas, water) shutdowns:

A. Internal Localized System/Service Shutdowns:

1. Localized shutdowns **require minimum 3 days' notice** to HWDSB project supervisor for coordination with the school facility and staff.
2. Shutdowns must be completed outside of school bell times/operational hours which vary by facility and must be scheduled for evenings after 6:00 PM, weekends or board holidays.
3. If a shutdown will impact the security system, the contractor shall contact API Alarm Inc. at 1-877-787-5237 and notify them in advance of the day(s) and time(s) of the shutdown.
4. If a shutdown impacts the fire alarm system, the contractor shall follow the Fire Alarm Bypass Protocol, section 4 above.
5. If required, the contractor is to coordinate with Board vendor/s to be on site to ensure boilers, roof top units, heat pumps, etc. are functioning properly after service disruption has concluded.

    - Chamberlain Building Services Inc - info@chbs.ca, 905-664-1914 or
    - Union Boiler Company Limited - info@unionboiler.com, 905-528-7977

6. Process will vary based on services shutdown and ability to localize shutdown.

B. Complete School System/Service Shutdowns:

1. Complete building shutdowns **require minimum 5 days' notice** to HWDSB project supervisor.
2. Shutdowns must be completed outside of school bell times/operational hours which vary by facility and must be scheduled for evenings after 6:00 PM, weekends or board holidays.
3. Contractor to contact API Alarm Inc. at 1-877-787-5237 and notify them in advance of the day(s) and time(s) of shutdown.
4. During the shutdown, the contractor is responsible for following Fire Alarm Bypass Protocol, section 4 above.
5. The contractor is to coordinate with Board vendor/s to be on site to ensure boilers, roof top units, heat pumps, etc. are functioning properly after service disruption has concluded.

    - Chamberlain Building Services Inc - info@chbs.ca, 905-664-1914 or
    - Union Boiler Company Limited - info@unionboiler.com, 905-528-7977

6. HWDSB project supervisor will coordinate with other HWDSB departments to ensure all systems (IIT, security, communications) are up and running after service disruption has concluded.
7. If required, HWDSB project supervisor will coordinate with City of Hamilton staff if site has shared facilities such as recreation centre, community centre, pool or library, etc.
8. Process will vary based on service shutdown.

C. Heating and Cooling System Shutdowns:

1. Heating and cooling system shutdowns **require minimum 5 days' notice** to HWDSB project supervisor
2. Shutdowns must be completed outside of school bell times/operational hours which vary by facility and must be scheduled for evenings after 6:00 PM, weekends or board holidays.
3. The contractor is to coordinate with Board vendor/s to be on site to ensure boilers, roof top units, heat pumps, etc. are functioning properly after service disruption has concluded.

    - Chamberlain Building Services Inc - info@chbs.ca, 905-664-1914 or
    - Union Boiler Company Limited - info@unionboiler.com, 905-528-7977

4. If the boiler system is drained, the contractor upon refilling the system, is responsible for coordinating Board approved chemical treatment vendor to treat water.

    - Aquarian Chemicals Inc - info@aquarianchemicals.com, 905-825-3711

5. Process will vary based on services shutdown and ability to localize shutdown.

D. Asbestos Abatement and Designated Substance Related Work:

1. Designated substance related work **requires minimum 5 days' notice** to HWDSB project supervisor.
2. Designated substance related work in occupied areas must be completed outside of school bell times/operational hours which vary by facility and must be scheduled for evenings after 6:00 PM, weekends or board holidays.

1.1 WORK OF THE PROJECT

.1 *Work* of the *Project*, of which *Work* of this *Contract* is a part, comprises the following:

.1 Demolition of existing main entrance exterior doors, screen assemblies and associated door hardware, including existing overhead power door operator.

.2 Supply and installation of new exterior doors and screen assemblies, including door hardware and new overhead power door operator.

.3 Reconnection to existing access control card reader and automatic push plate actuators at one new exterior door.

.4 Supply and installation of new HVAC unit and associated ductwork and grilles in the Main Entry Vestibule ceiling plenum, to replace an existing unit to be demolished.

.5 In the existing Main Entrance Vestibule; Replacement of existing suspended acoustic ceiling assembly with new ceiling assembly, the replacement of existing light fixtures and replacement with new LED light fixtures and the relocation of a ceiling mounted motion sensor.

.6 Removal and replacement of existing porcelain floor tile, with new porcelain floor tile at the elevated seating area, at the perimeter of the Atrium in the Foyer.

.7 Prepare and re-paint all metal components of the stair and guard assembly in the main Foyer.

.8 Sprinkler work to suit replacement of existing ceiling assembly in the Main Entry Vestibule.

1.2 WORK OF THIS CONTRACT

.1 *Work* of this *Contract* comprises the following:

.1 Renovations to Main Entrance and Foyer at Waterdown District High School.

.2 Municipal Address: 215 Parkside Drive, Waterdown ON L8B 1B9.

1.3 DIVISION OF WORK

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

1.4 SPECIFICATIONS LANGUAGE AND STYLE

.1 These specifications are written in the imperative mood and in streamlined form. The imperative language is directed to *Contractor*, unless stated otherwise.

.2 Complete sentences by reading "shall", " *Contractor* shall", "shall be", and similar phrases by inference. Where a colon (:) is used within sentences and phrases, read the words "shall be" by inference.

.3 Fulfill and perform all indicated requirements whether stated imperatively or otherwise.

.4 When used in the context of a *Product*, read the word “provide” to mean “supply and install to result in a complete installation ready for its intended use”.

1.5 CONTRACT DOCUMENTS FOR CONTRUCTION 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.

1.6 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 Safety Data Sheets (SDS) for all controlled *Products*.

1.7 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

1.1 RESTRICTIONS ON USE OF PREMISES

.1 Coordinate the use of the premises under the direction of the Owner.

.2 Smoking, vaping, drugs and alcohol are not permitted on School property. Anyone seen doing these will be removed from the property and not allowed back.

.3 Contractor will not have use of the existing washrooms in the building. Contractor is required to provide portable washroom facilities in a location suitable to the Owner, for the entire duration of construction. Any damage to the existing school property by Construction personnel is to be repaired and made good prior to construction completion.

.4 Contractor may have use of the existing school parking lot for parking of regular vehicles only, in an area as designated by the Owner, at the start of construction. Parking of construction vehicles is not permitted on the site.

1.2 WORK SEQUENCE

.1 The Contractor will have full use and access to the construction areas between June 30, 2025 and August 19, 2025.

.2 Contractor shall not disrupt the use and operation of the Daycare in the school building, that will remain open during construction.

1.3 RESTRICTED HOURS OF WORK IN FACILITIES

.1 *Work* may be performed all day from Monday to Sunday between June 30, 2025 and August 19, 2025. Contractor is to comply with City of Hamilton by-law requirements including all noise and construction by-laws.

.2 Coordinate with the Owner, any work that will affect other areas of the building; life safety systems etc.

.3 Coordinate with the Owner, any work that will affect other areas of the building; shut down of services etc.

1.4 NOISY WORK RESTRICTIONS IN FACILITIES

.1 Schedule excessively noisy work to avoid disturbance to the adjacent Daycare.

.2 Use powder actuated devices only with *Consultant*'s written permission.

.3 Contractor must follow all City by-laws in terms of noise, dust, debris etc., as required to facilitate scope of work.

1.5 MAINTAINING LIFE SAFETY SYSTEMS IN OCCUPIED FACILITIES

.1 Maintain operational life safety systems and public access to exits in occupied areas during all stages of the *Work*.

.2 Determine nature and exact locations of existing fire and smoke sensors prior to the commencement of the *Work*. Avoid direct or indirect jarring while working in adjacent areas and exercise caution to avoid triggering these devices.

.3 Be responsible for costs incurred by *Owner* on account of false fire alarms activated as a result of the execution of the *Work* without adequate precautions.

END OF SECTION

1.1 CASH ALLOWANCES FOR SUPPLY AND INSTALLATION OF PRODUCTS AND FOR SERVICES

.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 Refer to the Request for Tender document for the total stipulated sum of all cash allowances. The following cash allowance is carried in the project:

Reinstallation of existing card reader and door contacts.

.4 Cash Allowances, unless otherwise specified, cover the net cost to the Contractor of services, products, construction, machinery and equipment, freight, handling, unloading, storage installation and other authorized expenses incurred in performing the Work.

.5 The Contract Price will be adjusted by written order by the Consultant to provide for an excess or deficit to the Cash Allowance. Any unused portion of the allowance shall be returned to the Owner at the conclusion of the Contract.

.6 A schedule shall be prepared by the Contractor to show when items called for under Cash Allowances are required, so that the progress of the Work is not delayed.

.7 Expend cash allowances as directed by Consultant in writing. Allowances will be adjusted to actual cost with no adjustment to Contractor's charges. Cash expenditure must identify the H.S.T. separately.

1.2 EXPENDITURE OF CASH ALLOWANCES

.1 *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.

.2 *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*.

.3 *Owner,* through *Consultant*, will determine by whom and for what amount each cash allowance item will be performed.

END OF SECTION

1.1 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.

1.2 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 Requests for Substitutions, made during the question period, are to be reviewed by the Owner and the Consultant and will be determined if acceptable, via Addendum, prior to tender close. Refer to Owner's RFT document.

.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 during the tender phase only.

.4 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.

1.3 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 and 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

1.1 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.

.2 If unit prices included in the stipulated price contract are applicable to the proposed change, the adjustment of the Contract Price shall be based on those unit prices, to the extent they apply.

1.2 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 Provide a detailed breakdown of the price quotation.

.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.

1.3 FEES FOR OVERHEAD AND PROFIT – CHANGE ORDERS

.1 Refer to HWDSB RFT document and supplemental conditions.

1.4 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.

1.5 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.

1.6 FEES FOR OVERHEAD AND PROFIT – CHANGE DIRECTIVES

.1 Refer to HWDSB RFT Document and supplemental conditions.

.2 Where a Change Directive results in net savings on account of work not required to be performed and a net decrease in the Contractor's or Subcontractor's cost, the net savings to the Contractor or Subcontractor shall be calculated without any adjustment for fees for overhead and profit.

.3 When a Change Directive is ultimately recorded as a Change Order, there shall be no additional entitlement to fees for overhead and profit beyond those specified in this article.

1.7 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

1.1 SCHEDULE OF VALUES

.1 Prior to the first application for payment, submit for *Consultant*'s review an initial schedule of values. Modify the initial schedule of values if and as requested by *Consultant*. Obtain *Consultant*'s written acceptance of the initial schedule of values prior to the first application for payment. Schedule of values is to include full breakdown of mechanical, electrical and sprinkler works, prepared and submitted by the Contractor's Subcontractors on Subcontractors' letterheads.

.2 Together with the first and all subsequent applications for payment, submit updated versions of the schedule of values to indicate the values, to the date of application for payment, of work performed and *Products* delivered to *Place of the Work*.

.1 A work breakdown structure that is sufficiently detailed and comprehensive to facilitate *Consultant*'s evaluation of applications for payment at an appropriate level of detail.

.2 Provisions for approved *Change Orders,* allowances, unit price work and assignable contracts so that the breakdown amounts indicated in the schedule of values aggregate to the current total *Contract Price*. Also provide for indicating the estimated value of *Change Directives* within the schedule of values, separately from the current total *Contract Price*.

.3 For each item in the work breakdown structure, provide as a minimum the following information, under headings as indicated:

.1 Breakdown Amount: A dollar amount, including an appropriate pro rata portion of *Contactor*'s overhead and profit.

.2 Performed to Date: The value of *Work* performed and *Products* delivered to *Place of the Work* up to the date of the application for payment, stated as a percentage of the *Contract Price* and in dollars.

.3 Previously Performed: The value of *Work* performed and *Products* delivered to the *Place of the Work* for which payment has been previously certified, stated in dollars.

.4 Current Period: The value of *Work* performed and *Products* delivered to *Place of the Work* for which *Contractor* is currently applying for payment, stated in dollars.

.5 Balance to Complete: The value of *Work* not yet performed and *Products* not yet delivered to *Place of the Work*, stated in dollars.

1.2 WORKERS' COMPENSATION CLEARANCE

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

1.3 STATUTORY DECLARATIONS

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

1.4 PAYMENT REQUIREMENTS

.1 Refer to HWDSB RFT Document and supplemental conditions. 1.5

RELEASE OF HOLDBACK

.1 60 days following dated certificate of substantial performance.

END OF SECTION

1.1 CONSTRUCTION START-UP MEETING

.1 Promptly after *Contract* award, C*ontractor* shall establish the time and location of a construction start-up meeting to review and discuss administrative procedures and responsibilities. *Contractor* shall notify *Consultant* and *Owner* 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 *Contractor*'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 Work restrictions.
- .7 Cash allowances.
- .8 Substitution procedures.
- .9 *Contract* modification procedures.
- .10 Payment procedures.
- .11 Construction progress meetings.
- .12 Construction progress schedule, including long lead time items.
- .13 Submittals schedule and procedures.
- .14 Special 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 Commissioning.
- .28 Other items.

1.2 CONSTRUCTION PROGRESS MEETINGS

.1 Schedule regular bi-weekly construction progress meetings for the duration of the *Work*. *Contractor* shall prepare meeting agendas, chair the meetings, and record and distribute the minutes.

.2 Arrange for and provide physical space for meetings.

.3 *Contractor* shall record in the meeting minutes significant decisions and identify action items and action dates by attendees or the parties they represent.

.4 *Contractor* shall 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

1.1 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.

1.2 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 date(s) 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 and native digital file format.

.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 monthly to *Owner* and *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.

.6 Include a written report with each updated progress schedule. Indicate work status to date comparing baseline to actual progress, current forecasts, identifying problem areas, anticipated delays and impact on schedule, and planned corrective actions.

1.3 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* and the Owner 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 *Owner* and *Consultant*.

1.4 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* and *Owner*, 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.

1.5 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.

1.6 PROGRESS PHOTOGRAPHS

.1 Arrange for periodic digital photography to document and provide a photographic record of the progress of the *Work*. Photos shall be provided with the submission of each monthly progress invoice.

.2 Identify each photograph by project name and date taken.

.3 Submission: Submit .jpg format files in standard resolution via e-mail, monthly with the submission of each progress draw.

.4 Do not use progress or any other *Project* photographs for promotional purposes without *Owner*'s written consent.

END OF SECTION

1.1 ADMINISTRATIVE

.1 Submit specified submittals to the Owner and the *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 permitted. If construction *Drawings* are used for this purpose, remove references to *Consultant*.

.9 Do not propose Substitutions or deviations from *Contract Documents* via *Shop Drawing*, *Product* data and sample submittals.

1.2 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*.

.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 safety data sheets (SDS) 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 10 *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* or commissioning agent 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*.

1.3 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

PART 1 – GENERAL

1.1 CONSTRUCTION SAFETY

.1 Observe and enforce construction safety measures required by the Ontario Building Code, Canadian Construction Safety Code, Ontario Occupational Health and Safety Act, Workplace Safety & Insurance board (WSIB) and Municipal Statutes and Authorities.

.1 The Contractor is again reminded that the Contractor is responsible for Occupational Health and Safety on this project. The items listed below are only guidelines of the Owner's expectations in this regard and not to be construed to be comprehensive or total in nature.

.2 In particular, the Ontario Construction Safety Act, the regulations of the Ontario Department of Labour and Ontario Hydro Safety Requirements shall be strictly enforced.

.3 In event of conflict between any provisions of above authorities the most stringent provisions will apply.

.4 The Contractor shall inform and instruct Other Contractors that they, while performing work on this project, are under the authority of the Contractor. Other Contractors are to discuss and co-ordinate with, and follow instructions from, the Contractor on all matters of site access, vehicles, deliveries, storage, temporary facilities, coordination with the work of other subcontractors, work methods, scheduling, labour conditions, construction safety, environmental protection, security and all other matters which relate to the safe and proper execution of construction work.

.5 The Contractor shall ensure that all supervisory personnel on job site are fully aware of the procedures and requirements outlined herein and comply with all requirements specified.

.6 All contractors are responsible to ensure that all machinery and/or equipment are/is safe and that the workers perform their tasks in compliance with established safe work practices or procedures. Workers must receive adequate training in their specific work tasks to protect their health and safety.

.7 The Contractor shall be responsible for all persons and companies performing work, including other Contractors, on this project, at all times, up to and including, the date of Substantial Performance of the Work. Authority for coordination and instructions relating to all matters which relate to the safe and proper execution of construction work shall rest with the Contractor. The Contract Price will include the Contractor's fees for the coordination and supervision of the work of all other contractors.

.8 In addition to the responsibility of all contractors as outlined in 1.1.10, above, Subcontractors will be held accountable for the health and safety of workers under their supervision.

.9 Every worker must protect his/her own health and safety by working in compliance with the law and with safe work practices and procedures established by the authorities having jurisdiction.

.10 All sections of the Occupational Health and Safety Act for Industrial Establishments, latest edition, and the Occupational Health and Safety Act for Construction Projects, latest edition, shall be enforced, by the Contractor, in their entirety, throughout the duration of the construction project.

.11 The Contractor shall provide the Consultant with the telephone number where the Contractor or his representative can be reached at any time, day or night, for the duration of the contract.

.12 Where an accident, explosion, or fire causes a person injury at the work place, and the worker is disabled from performing the usual task, the Contractor shall prepare a written notice and shall forward same to the Ministry of Labour within four days of the occurrence with a copy to the health and safety representative or the Joint Health and Safety Committee, containing such information and particulars as may be prescribed.

.1 Where a person is killed or critically injured from any cause at the work place, the Contractor shall immediately call the Ministry of Labour. A written notice from the Contractor shall be given to the Ministry of Labour within forty-eight hours after the occurrence, containing such information and particulars as may be prescribed, with copies to the Consultant and the Owner's Representative.

.2 The Contractor is advised that the accident scene is under the jurisdiction of the Ministry of Labour and no wreckage, articles, etc., shall be interfered with, disturbed, destroyed, altered or carried away at the scene, or connected with the occurrence, until the Ministry of Labour has given permission.

1.2 REPORT ACCIDENTS

.1 Promptly report in writing to the Owner and the Consultant all accidents which cause death, personal injury or property damage, arising out of or in connection with the performance of the work on or adjacent to the site. Where death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to the Consultant and to the relevant public authorities.

.2 If any claim is made by anyone against the Contractor or Subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Owner and the Consultant giving full details of the claim.

1.3 FIRST AID FACILITIES

.1 Provide at the site the equipment and medical facilities necessary to supply first-aid service to anyone who may be injured in connection with the Work, and to conform to the requirements of the authorities having jurisdiction over the Work.

1.4 FIRE SAFETY REQUIREMENTS

.1 The appropriate clauses of the Ontario Building Code, Ontario Fire Code, National Building Code of Canada and National Fire Code relating to fire safety and protection shall be strictly followed.

.2 Provide and maintain free access to temporary or permanent fire hydrants acceptable to local fire department.

.3 Provide sufficient temporary standpipes and connections, fire hose, valves, temporary cabinets, extinguishers, etc. to comply with the requirements of the governing Municipal and Provincial authorities.

.4 Make necessary adjustments and modifications to temporary fire protection as required during progress of the work. Remove such temporary work when permanent system is installed and operating.

.5 Conform to "Guidelines for Maintaining Fire Safety During Construction in Existing Buildings", provided by the Office of the Ontario Fire Marshal.

.1 Maintain existing exits and access to exits. Where an exit must be blocked, provide an alternate exit acceptable to Authorities Having Jurisdiction.

.2 Provide minimum 45 minute rated fire separations at junction between existing corridors in occupied spaces and new corridors under construction. Any required access through these partitions shall be with rated doors, frames with closers and latching.

.3 Maintain exiting fire department access route or provide new, or temporary, access route acceptable to the fire department.

.4 Do not store combustible materials adjacent to existing building or where such materials could pose a fire hazard to the building or the occupants.

.5 Where temporary openings are made in existing floors, pack with mineral wool insulation to create temporary fire barrier.

.6 Existing fire alarm system is to be kept operational throughout the construction period. Keep fire department informed of any temporary shutdowns and arrange for alternate fire safety measures to be implemented during that period.

.7 Refer to the Ontario Fire Code for requirements for temporary shutdown of fire protections systems, including sprinklers and standpipe systems.

.8 Modify Fire Safety Plan in accordance with the Fire Code, when required to facilitate construction. Such modifications shall be determined in cooperation with the Owner and the local fire department.

1.5 OVERLOADING

.1 Ensure no part of Work is subjected to a load which exceeds the existing design live loads. Ensure that scaffolding and false work are not overloaded. Do not cut load bearing members without approval of Consultant.

1.6 FALSEWORK

.1 Design and construct falsework in accordance with CSA S269.1 latest version.

1.7 VISITORS

.1 Provide hard hats for use by all visitors.

.2 Visitors must sign in to the work site and be accompanied by the Site Superintendent.

1.8 ADDITIONAL REQUIREMENTS FOR OCCUPIED SITES

.1 Access Control:

.1 The Contractor shall instruct all suppliers and subcontractors that they are required to contact the Site Supervisor by cell phone prior to entering the site, and await escort.

.2 Gates and construction enclosure must remain closed and locked at all times and only opened for the time required for access/egress of authorized personnel.

.3 Site Communication:

.1 The Contractor shall provide the Owner and the Consultant with an emergency contact telephone number at which the Site Supervisor or other Contractor representative can be contacted directly during work hours and with voicemail available at all other times, including weekends and holidays, which will be checked regularly.

.2 Site Supervisor and flagman must have means of direct communication available at all times during work hours.

.3 Contractor shall be in daily communication with the Owner and the Consultant to determine any activities which may involve safety concerns, whether library related or construction related.

.4 Site Safety requirements (flag person etc.), are to be followed as required to facilitate scope of work.

1.9 SIGNAGE

.1 Provide signage indicating " Danger - Keep Out", "Hard Hats must be worn at all times", "Safety Shoes must be worn at all times", "No Trespassing", etc., mounted on all sides of Site, and additional signs as necessary to adequately warn the public and workmen of the inherent dangers of the site and requirements to maintain personal safety. Safety Signage is also required at all construction entrances.

END OF SECTION

1.1 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 MPP – 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

1.2 INDEPENDENT INSPECTION AND TESTING AGENCIES

.1 Retain and pay for inspection and testing that is for *Contractor*'s own quality control or is required by regulatory requirements.

.2 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.

.3 Submit test samples required for testing in accordance with submittals schedule specified in Section 01 32 00 – Construction Progress Documentation.

.4 Provide labour, *Construction Equipment* and temporary facilities to obtain and handle test samples on site.

1.3 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* and *Owner* copies of reports. Submit within 3 days after completion of inspection and testing.

END OF SECTION

PART 1 – GENERAL

1.1 REGULATING DOCUMENTS

.1 Conform to the Ontario Building Code, Ontario Fire Code, Accessibility for Ontarians with Disabilities Act, Canadian Electrical Code (CEC), The Occupational Health and Safety Act, Ontario, the local municipal Fire Code, and all other applicable Codes and Building By-Laws. Conform to the requirements of the authorities having jurisdiction, such as public utilities.

.2 Contract forms, codes, standards and manuals referred to in these specifications are the latest published editions at the date of close of tenders. Meet or exceed requirements of specified standards.

.3 Contractor to provide for and abide by any and all current Health & Safety requirements as per the Province of Ontario.

.4 Provide copies of documents referred to in the Specification for joint use of Contractor and Consultant, on site.

END OF SECTION

PART 1 – GENERAL

1.1 POWER AND WATER SUPPLY

.1 Provide all temporary light and power complete with all wiring, lamps and similar equipment as required for completion of the Work. Provide adequate lighting for all workmen, sufficient for safety and for execution of good workmanship, taking particular care to observe all safety requirements. Adequate temporary lighting will be insisted upon. The Owner will not be liable for any loss, damage, delay, or claims for extra costs resulting from lack of services.

.2 Existing building services may be used, where approved in writing by the Owner's representative. This does not include emergency generators or batteries. All costs resulting from the use of these services are the responsibility of the Contractor.

.3 Water supply: The existing building water service may be used to supply potable water for construction use.

.4 The use of the building's electrical service is allowed to facilitate the scope of work, if required and approved via email by the Owner.

1.2 TEMPORARY VENTILATION

.1 Provide local exhaust ventilation to prevent harmful accumulations of hazardous substances into atmosphere of occupied areas. Dispose of exhaust materials in manner that will not result in harmful exposure to persons.

.2 Ventilate storage spaces containing hazardous or volatile materials. Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful elements. Store paints & solvents in secure, locked, ventilated room at all times.

.3 Protect existing ducting system with filters, inspect daily and replace weekly or more frequently as necessary. Finally vacuum clean ducting system and replace filters at completion of the Work.

.4 Maintain strict supervision of operation of temporary ventilating equipment. Contract documents for work under this contract consists of the following:

- .1 Enforce conformance with applicable codes and standards.
- .2 Enforce safe practices.
- .3 Prevent abuse of services.
- .4 Prevent damage to finishes.
- .5 Vent direct-fired combustion units to outside.

1.3 FIRE EXTINGUISHERS

.1 An adequate number of ABC type fire extinguishers shall be provided for the protection of the work during construction.

1.4 REMOVAL OF TEMPORARY UTILITIES

.1 Remove temporary utilities from site when directed by Consultant and/or at the completion of the project

END OF SECTION

1.1 CONTRUCTION 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 Wor*k when no longer required.

1.2 CONSTRUCTION PARKING

.1 Parking is available on School property for parking of regular vehicles.

.2 Parking of construction vehicles is not permitted on the site.

.3 Parking of regular vehicles is allowed on school property during the summer, after school hours and on weekends. For parking during the school year/day successful vendors are to provide a location for review /approval by the Owner.

1.3 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.

.3 Regarding school access requirements, vendors are to reference the front-end document for details.

1.4 SITE OFFICES

.1 Contractor is to provide an office trailer, if required, as there is limited room within the school. The location of the site office trailer is to be reviewed and approved by the Owner prior to placement.

.2 Provide an area for an office, with suitable lighting, of sufficient size to accommodate site meetings and furnished with a table and chairs.

1.5 SANITARY FACILITIES

.1 Contractor does not have use of the existing public washrooms in the building. Access to Contractor is to provide their own portable toilets. Location is to be provided by the successful Contractor for review and approval by the Owner, via email prior to

construction. Portable toilets are to be contained within the approved staging area and should be locked at all times when the Contractor is not on site.

.2 Keep sanitary facilities clean and fully stocked with the necessary supplies.

1.6 FIRE PROTECTION

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

END OF SECTION

1.1 BARRIERS AND ENCLOSURES - GENERAL

.1 Provide temporary barriers and enclosures necessary to protect the public and to secure *Place of the Wor*k during performance of the *Work*.

.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.

1.2 FENCING

.1 Erect temporary security and safety site fencing of type and height determined by *Contractor*, subject to applicable regulatory requirements.

.2 Provide lockable access gates as required to facilitate construction access.

1.3 DUST TIGHT SCREENS AND PARTITIONS

.1 Provide dust tight screens to localize interior building areas from dust and noise generating activities.

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

.3 Supply and install temporary exterior grade plywood construction hoarding and dust proof partitions in the existing main entrance doorway once existing doors and frames are removed.

.4 Exterior hoarding is to be erected sealed tight to exterior wall to protect the building interior from weather and keep the building secure.

1.4 FIRE ROUTES

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

1.5 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*.

.2 Any damage caused by the Contractor to existing building finishes is their responsibility to repair at their own cost.

1.6 SECURITY

.1 The Contractor shall be entirely responsible for supervision of project and for protection of public from vehicles in movement, for stockpiled materials and construction. Vehicular parking and stockpile materials must be maintained on the construction staging area only. No street parking or stockpiling will be allowed on the Municipal streets.

.2 The Contractor is responsible for the prevention of vandalism and theft of all tools, equipment and materials until date of Substantial Performance of Contract.

.3 Contractor is responsible to lock up equipment, material etc. Security of any materials, equipment, portable toilets, garbage bins, vehicles etc. are the Contractor's responsibility.

.4 Ensure Site Safety requirements (flag person etc.), are followed as required to facilitate scope of work.

END OF SECTION

1.1 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.

1.2 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.

END OF SECTION

1.1 EXISTING UTILITIES AND STRUCTURES

.1 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.

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

1.2 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

1.1 SUMMARY

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

1.2 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.

1.3 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.

1.4 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.

1.5 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.

1.6 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.

1.7 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.

1.8 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*.

1.9 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

1.1 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.

1.2 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.

1.3 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.

1.4 EXISTING UTILITIES

.1 Where the *Work* involves breaking into or connecting to existing services, give *Owner* 5 working days notice for necessary interruption of mechanical or electrical services.

.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.

1.5 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

1.1 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.

1.2 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.

.5 Owner caretaking equipment is not to be used by general contractor or subtrades.

1.3 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.

.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 as required.

.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 Use mud mats and provide continuous street cleaning to ensure the surrounding community has the least disturbance from construction, as required to facilitate scope of work.

1.4 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, floors and ceilings.

.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, 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 accessible concealed spaces.

.12 Clean interior window glass and frames.

1.5 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

1.1 READY-FOR-TAKEOVER

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

1.2 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.

1.3 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.

1.4 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.

1.5 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

1.1 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 electronic format.

1.2 OPERATION AND MAINTENANCE MANUAL FORMAT

.1 Organize data in the form of an instructional manual.

.2 Cover Page: Identify with the title “Operation and Maintenance Manual”, name of Project and facility name, building number, and subject matter of contents.

.3 Arrange content by systems and divions under Section numbers and sequence of Table of Contents.

.4 Provide sub-folders for each divisionfor each separate *Product* or system, with typed description of *Product* and major component parts of equipment.

.5 Text: Manufacturer's printed data.

.6 Drawings to be provided in PDF format.

.7 Provide electronic copy of manual in PDF format.

.8 Provide electronic copy of Shop *Drawings* in manual PDF format via digital link.

1.3 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.

.4 For each *Product* or system, include complete contact information for *Subcontractors*, *Suppliers* and manufacturers, including local sources for supplies and replacement parts.

.5 *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.

.6 Reviewed *Shop Drawings*.

.7 Permits, certificates, letters of assurance and other relevant documents issued by or required by authorities having jurisdiction.

.8 Warranties.

.9 Operating and maintenance procedures, incorporating manufacturer's operating and maintenance instructions, in a logical sequence.

.10 Training materials as specified in Section 01 79 00 - Demonstration and Training.

.11 Inspection and Testing reports and certificates.

1.4 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.

1.5 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.

1.6 OPERATION AND MAINTENANCE MANUAL - WARRANTIES CONTENT

.1 Separate each warranty with sub-folders 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.

1.7 CONTRACTOR’S AS-BUILT DRAWINGS

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

1.8 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

1.1 SUMMARY

.1 Demonstrate and provide training to *Owner*'s personnel on operation and maintenance of equipment, building envelope and systems prior to scheduled date of *Ready-for-Takeover of the Work*.

.2 *Owner* will provide list of personnel to receive training and will coordinate their attendance at agreed upon times.

.3 Coordinate and schedule demonstration and training provided by *Subcontractors* and *Suppliers*.

1.2 SUBMITTALS

.1 Submit proposed dates, times, durations, and locations for demonstration and training of each item of equipment and each system for which demonstration and training is required. Allow sufficient time for training and demonstration for each item of equipment or system, or time as may be specified in technical *Specifications*.

.2 *Consultant* and *Owner* will review submittal and advise *Contractor* of any necessary revisions.

.3 Submit report(s) within 5 *Working Days* after completion of demonstration and training:

.1 identifying time and date of each demonstration and training session,
.2 summarizing the demonstration and training performed, and
.3 including a list of attendees.

.4 Submit video record of demonstration and training together with report.

1.3 PREREQUISITES TO DEMONSTRATION AND TRAINING

.1 Testing, adjusting, and balancing has been performed in accordance with *Contract Documents*.

.2 Equipment and systems are fully operational.

.3 Copy of completed operation and maintenance manual is available for use in demonstration and training.

.4 Conditions for demonstration and training comply with requirements specified in technical *Specifications*.

1.4 DEMONSTRATION AND TRAINING

.1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment and system.

.2 Review operation and maintenance manual in detail to explain all aspects of operation and maintenance.

.3 Prepare and insert additional information in operation and maintenance manual if required.

END OF SECTION

1.1 COMMISSIONING AGENCY

.1 *Contractor* shall retain and pay for commissioning agency to provide commissioning services for the *Project*.

1.2 CONTRACTOR RESPONSIBILITIES

.1 Prepare each system ready for commissioning. Verify systems installation is complete and in operation.

.2 Coordinate commissioning with and assist commissioning agency.

.3 Perform and document verification, performance testing, adjusting, and balancing operations.

.4 Cooperate with commissioning agency and provide access to equipment and systems.

.5 Provide personnel and operate systems at designated times, and under conditions required for proper commissioning.

.6 Make instruments available to commissioning agency to facilitate spot checks during commissioning.

.7 Participate in commissioning meetings.

.8 Complete commissioning forms as requested by commissioning agency.

.9 Correct deficiencies identified in commissioning process.

.10 Incorporate commissioning data into operation and maintenance manual.

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

.12 Provide instruments necessary for commissioning.

1.3 COMMISSIONING AGENCY RESPONSIBILITIES

.1 The commissioning agency will:

.1 Prepare a commissioning plan, including systems to be commissioned, forms, checklists and responsibilities of commissioning team members.

.2 Implement the commissioning plan and lead the commissioning team through start-up, verification, performance testing, training, and document preparation.

.3 Convene, chair, prepare and distribute minutes of commissioning meetings.

.4 Supervise commissioning activities and witness inspections and tests.

.5 Make periodic site visits for the purpose of selective checking of accuracy of commissioning form submissions, witness testing, and review of mock-ups.

.6 Review content of operations and maintenance manual.

.7 Provide instruments necessary for commissioning.

1.4 CONSULTANT RESPONSIBILITIES

.1 *Consultant* will:

.1 Participate in commissioning meetings.

.2 Coordinate commissioning agency's involvement in *Shop Drawing* review process.

.3 Review verification and performance test results and direct *Contractor* to correct defects or deficiencies in the *Work*.

.4 Initiate *Change Orders* or *Change Directives* identified as necessary by the commissioning process.

.5 Review final commissioning report.

1.5 OWNER RESPONSIBILITIES

.1 *Owner* will:

.1 Assign operations and maintenance personnel to participate in meetings, and witnessing of demonstration, and training.

.2 Designate a person to acknowledge receipt of reports.

1.6 SCHEDULE OF EQUIPMENT AND SYSTEMS TO BE COMMISSIONED

.1 To be confirmed.

END OF SECTION

PART 1 – GENERAL

1.1 RELATED WORK

.1	Temporary Barriers and Controls	Section 01 56 00
.2	Execution	Section 01 73 00

1.2 REFERENCES

.1 Conform to all laws, By-Laws and regulations of the authorities having jurisdiction and, in particular, the Ontario Occupational Health and Safety Act; The Environmental Protection Act; The Ontario Building Code, The Ontario Fire Code; The National Building Code, and the National Fire Code.

.2 CSA S350-M, code of practice for safety in demolition of structures.

.3 Ontario regulations under the Environmental Protection Act:
- .1 O.Reg. 102/94 Waste Audits and Waste Reduction Work Plans
- .2 O.Reg. 103/94 Industrial, Commercial and Institutional Source Separation Programs
- .3 O.Reg. 347/90 General - Waste Management; refer to "Definitions"

.4 Ontario regulations under the Occupational Health and Safety Act:
- .1 O.Reg. 213/91 Construction Projects
- .2 All regulations regarding “Designated Substances”
- .3 O.Reg. 860/90 Workplace Hazardous Materials Information System (WHMIS)

.5 Conform to “Guidelines for Maintaining Fire Safety During Construction in Existing Buildings”, provided by the Office of the Ontario Fire Marshal.

.6 RFCI Recommended Work Practices for Removal of Resilient Floor Coverings

1.3 EXAMINATION OF EXISTING SITE AND STRUCTURE

.1 Examine the existing site and building before tendering to be familiar with the detailed extent of demolition, dismantling, relocation and reassembly required.

.2 Examine the drawings and include all costs associated with the work, including after-hours work and remobilization costs.

.3 No allowance will be made for failure to obtain complete information prior to close of tenders.

1.4 SUMMARY OF WORK

.1 Carry out all alteration and demolition work required to accommodate new work indicated on drawings. Make good any damage caused by alterations required.

.2 Remove HVAC equipment, electrical fixtures and all other items so noted on drawings as required for the renovation, unless otherwise noted.

.3 Unless noted otherwise, building materials resulting from demolition under this contract shall become the property of the Contractor, and shall be removed by the Contractor.

.4 Supply and install temporary dust proof partitions at junctions with work area. Dust proof partitions shall remain in place until the work is fully commissioned and accepted by the Owner.

.5 Supply and install exterior grade insulated plywood construction hoarding at all exterior openings. Keep hoarding in place temporarily until doors and screen are installed. Refer to architectural drawings for location of existing door and screen to be replaced.

1.5 SCHEDULE OF WORK

.1 Safety and required exiting from the existing building must be maintained at all times, particularly during operating hours and scheduled events. Work must be suspended if the Owner advises that noise and/or dust is interfering with the building operation.

.2 Work which will generate excessive noise, dust, odour and vibration must be coordinated with the Owner to comply with City by-laws.

.3 Construction will be occurring in other areas of the building, far from the area of work described in this Contract. Coordinate, with the Owner, any work that may affect buildings systems and operation, including the shut-down of any building systems.

.4 Construction hoarding and dust-proof partitions must be installed prior to any work being undertaken.

1.6 PROTECTION

.1 Protect adjacent areas against damage which might occur from falling debris or other cause. Make good damage resulting from Work of this Contract.

.2 Protect existing building from damage and contamination during demolition activities. All openings must be made weatherproof. Provide temporary barriers, dust control measures, security controls, supports, and such additional protection as may be required by specific demolition work.

.3 Install construction hoarding partitions to protect the existing building from the exterior and the elements and to protect the existing construction zone from adjacent building areas and adjacent construction areas.

.4 Temporary dust proof partitions:

.1 Install temporary dust proof partitions at openings between the construction area and the adjacent building areas as required to prevent the movement of construction dust and debris.

.2 Supply and install 10 mil polyethylene sheet caulked all around with offset joints taped and filled.

.5 Temporary exterior construction hoarding to separate construction area from occupied building areas, to be installed temporarily at the main building entrance where existing exterior doors and screen are removed. Supply and install hoarding constructed of:

- 2 layers of Type X 16mm gypsum board, unfinished on construction interior side on
- 152mm steel stud framing at 400mm O.C. minimum.
- Fill with batt insulation full thickness of studs.
- 6 mil polyethylene sheet membrane; polyethylene sheet taped and sealed at complete perimeter and to existing building partitions, floors and ceiling assemblies above.
- 13mm exterior grade plywood panels on exterior side.

.6 Prevent movement, settlement, and damage to existing building to remain, including services, paving, landscaped areas to remain, and adjacent structures. Provide temporary supports, including shoring and bracing, as required. All shoring must be designed by a professional engineer licensed in the Province of Ontario.

.7 Employ licensed rodent and vermin exterminators to destroy all discovered vermin and rodents.

.8 Remove contaminated and dangerous material from the site and dispose of safely and legally. Meet all M.O.E. requirements.

.9 Take precautions to guard against movement or settlement of adjacent land, existing building, and remaining services and utilities. Provide and place bracing or other means of support.

.10 Take precaution against contamination of air and adjacent properties.

1.7 MAINTAINING FIRE SAFETY IN EXISTING BUILDING

.1 Maintain all required exiting for safe operations within the existing building. Where an exit is closed off due to construction activities, provide alternate exit acceptable to both the Consultant and to Authorities Having Jurisdiction. Any temporary exits must be clearly identified with appropriate signage.

.2 Maintain access roadways for fire department vehicles, acceptable to the fire department. Access must be approved prior to commencement of construction activities.

.3 Store all combustible materials in accordance with the Fire Code and the Occupational Health and Safety Act. Do not store combustible materials within the existing building or

against the building. All combustibles shall be stored in a manner which minimizes risks to building and occupants.

.4 Maintain dust proof partitions and protection at openings, as specified above, with fire separation ratings as required by Authorities Having Jurisdiction.

.5 Maintain fire alarm system in operating condition in existing building. Notify the fire department and Owner of any temporary shutdowns of service and provide alternative measures during such periods of time.

.6 Coordinate with Owner and Authorities Having Jurisdiction for all changes to fire emergency procedures as may be required during construction.

1.8 SERVICES

.1 Seal and cap mechanical and electrical services in order to facilitate removals indicated on drawings. Mark location and type of service of all capped services at the site. Submit record drawing showing locations and dimensions of all capped services.

PART 2 – PRODUCTS

2.1 Not Used

PART 3 – EXECUTION

3.1 GENERAL

.1 Remove and dispose of any remaining furniture, fixtures, fittings and equipment remaining in the work area, which are not shown to be relocated or reused in the completed project.

.2 Protect all items indicated to be removed and later reinstalled. These items shall be removed prior to demolition work wherever possible. It will be the responsibility of the Contractor to repair or replace any such items damaged by careless handling.

.3 Refer also to demolition and alteration notes on drawings.

3.2 DEMOLITION

.1 Remove and carefully lower wood or steel framing as applicable.

.2 Remove interior ceiling assemblies as indicated on drawings, and as required to accommodate new construction.

.3 Remove all items not indicated or noted to remain or be re-used.

.4 Remove mechanical and electrical equipment and piping indicated to abandoned. Refer to mechanical and electrical demolition drawings.

.5 Any items noted to be re-used or re-located are to be removed carefully, cleaned, packaged appropriately, and handed over to Contractor.

.6 Upon discovery of mold or moldy materials remove and dispose of these separately.

.7 If any materials suspected to contain asbestos and other designated substances are encountered, do not disturb these materials. Inform the Consultant of the location and extent of suspect material. Do not resume work in this area until it has been cleared by an Abatement Consultant.

.8 At the end of each day's work, leave work in a safe condition so that no part of the remaining structure is in danger of collapse.

.9 Do not burn any refuse or debris at the site.

3.3 REMOVAL OF EXISTING FLOOR FINISHES

.1 Existing floor finishes shall be removed and old adhesive and grout removed from the existing concrete slab by scraping or solvent, in accordance with Health & Safety requirements. Grind the existing concrete slab-on-grade in its entirety to completely remove all existing mastics and grout as required and to make the existing concrete slab-on-grade smooth and flush in preparation for the installation of new flooring materials.

.2 Existing concrete floors shall be prepared according to manufacturer’s instructions for new adhesive applied finishes where indicated on the drawings.

3.4 REMOVAL OF CEILINGS

.1 Remove existing ceilings and bulkheads in areas where new ceilings and bulkheads are indicated, and as shown on drawings.

.2 Ceilings to be demolished shall be removed complete with all finishes, framing, suspension system, trim, fasteners, and accessories.

.3 Where ceilings are to be removed to accommodate work, and later reinstalled, carefully disassemble ceilings to the extent required. Clean all components, wrap for protection, clearly label package contents, and store in a safe location until they are to be reinstalled.

.4 Where ceilings are to remain after adjacent walls or bulkheads are demolished, remove ceiling components as required to complete demolition work. Coordinate with forces doing new ceiling work, to confirm what components are to be retained for reuse. Cut ceiling tiles may not be used; new full or appropriately cut tiles will be required.

.5 Where ceiling mounted equipment is indicated to be removed and reused, or where it must be temporarily removed to accommodate the Work, it is to be carefully removed, cleaned, wrapped, labelled as to contents, and stored in a safe location, ready for reinstallation.

3.5 MECHANICAL AND ELECTRICAL WORK

.1 Mechanical and Electrical services must be temporarily capped or terminated to permit renovation in existing areas to proceed.

.2 Refer to mechanical and electrical drawings for the extent of removals, relocations, and alterations required.

.3 Ceiling mounted mechanical and electrical equipment which is to be removed and reused is to be carefully removed and stored as specified above.

.4 Cutting of holes up to 100mm in size in the existing structure and surfaces required by the mechanical and electrical trades shall be by those Subcontractors. Cutting and patching of openings greater than 100mm in size shall be by the Contractor in co-ordination with those trades. PATCHING OF ALL HOLES IN EXPOSED FINISHED SURFACES SHALL BE BY THE CONTRACTOR. Mechanical and Electrical trades shall do their own coring of existing slabs as required.

3.6 COMPLETION OF WORK

.1 Remove all surplus materials, equipment and rubbish from the site.

.2 Leave site in condition to meet approval of the Consultant.

.3 On completion of Demolition work, thoroughly clean all existing surfaces to remain, including ceiling space. No debris shall remain to be enclosed by new construction.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Sealants and caulking for exterior wall openings and joints.
.2 Sealants and caulking for interior wall openings and joints.
.3 Sealants and caulking for floor joints.

1.2 RELATED WORK

.1	General Requirements	Division 01
.2	Aluminum Doors and Frames	Section 08 13 16
.3	Ceramic Tiling	Section 09 30 13
.4	Plumbing Fixtures	Division 22

1.3 REFERENCES

.1	CGSB-19-GP-5M	Sealing Compound, One Component, Acrylic Base, Solvent Curing.
.2	CAN/CGSB-19.13	Sealing Compound, One-Component, Elastomeric, Chemical Curing.
.3	CAN/CGSB-19.17	One-Component Acrylic Emulsion Base Sealing Compound.
.4	CAN/CGSB-19.21	Sealing and Bedding Compound, Acoustical.
.5	CAN/CGSB-19.22	Mildew Resistant Sealing Compound for Tubs and Tiles.
.6	CAN/CGSB-19.24	Multi-Component, Chemical Curing Sealing Compound.
.7	CAN/ULC-S711.1	Standard for Thermal Insulation – Bead-Applied One Component polyurethane Air Sealant Foam, Part 1.
.8	CAN/ULC-S711.1	Standard for Thermal Insulation – Bead-Applied Two Component Polyurethane Air Sealant Foam, Part 1 : M.

1.4 APPROVED MANUFACTURERS

.1 The products of the following manufacturers are approved for use subject to meeting the specifications for the particular type of sealants listed below. However, this is not an approval to substitute another type of sealant for those specified unless the material manufacturer requests change in his product in writing to the Consultant.

.1 Canadian General Electric Company Ltd.
.2 Dow Corning Canada Inc.
.3 Tremco

.2 Material manufacturers must be willing to review Shop Drawings and drawing details, visit the site to review sealant installation and provide written reports to the Consultant.

1.5 INSTALLER QUALIFICATIONS

.1 Sealants and caulking shall be installed by a specialized Subcontractor, having skilled mechanics thoroughly trained and competent in all aspects of caulking work, with minimum 5 years' experience. Provide proof of experience for Consultant review.

.2 Sealants shall be appropriate for the application and materials to be caulked.

1.6 SUBMITTALS

.1 Submit samples of each sealant, in conformance with Section 01 33 23 – Shop Drawings, Product Data and Samples.

.2 Provide colour cards for Consultants selection.

.3 Submit written adhesion and compatibility approval from the sealant manufacturer for all materials to be sealed.

1.7 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.

1.8 ENVIRONMENTAL AND SAFETY REQUIREMENTS

.1 Comply with requirements of Workplace Hazard Materials Information System (WHIMIS) regarding use, handling, storage, and disposal of hazardous materials, and regarding labelling and provision of material safety data sheets acceptable to the authority having jurisdiction.

.2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

.3 Ventilate area of work as required and as may be directed by the Consultant by use of approved portable supply and exhaust fans.

1.9 WARRANTY

.1 Extend Contractor's warranty to five (5) years, in writing. Warranty shall commence on the date of Substantial Performance.

.2 Defective work shall include, but not be restricted to, joint leakage, cracking, crumbling, melting, running, loss of adhesion, loss of cohesion, or staining of adjacent surfaces.

.3 Provide manufacturer's project-specific 20 year non-staining warranty and 10 year weather seal warranty for "Type A" sealant listed below.

PART 2 – PRODUCTS

2.1 MATERIALS

.1 Sealant Type A: For exterior locations. Non-Staining, primer less, silicone weather-proofing sealant:
- .1 SilPruf SCS9000 NB, manufactured by Canadian General Electric Company Limited, Dow Corning 756 SMS, manufactured by Dow Corning Canada Inc., or
- .2 Spectrem 3, manufactured by Tremco Ltd., and
- .3 conforming to the product properties published.

.2 Sealant Type B: For interior locations. Non-staining, primer less, silicone hybrid sealant:
- .1 SCS7000, manufactured by Canadian General Electric Company Limited.
- .2 Dow Corning 756 SMS, manufactured by Dow Corning Canada Inc., or
- .3 Spectrem 3, manufactured by Tremco Ltd., and

.3 Sealant Type C: For interior locations where conditions of high humidity exist such as washrooms, showers, Mildew resistant, one component silicone conforming to CGSB 19-GP.22M and ASTM C920:
- .1 CGE SCS1700 Sanitary Sealant,
- .2 Dow Corning 786, or
- .3 Tremco Tremsil 200 White

.4 Sealant Type D: For interior locations. Paintable, non-staining, primer less, silicone hybrid sealant:
- .1 SCS7000, manufactured by Canadian General Electric Company Limited.

.5 Sealant Type E:
- .1 Multi-component, epoxidized polyurethane sealant conforming to CAN/CGSB-19.24, Type 2, Class B, SWRI Certified.
- .2 Dymeric 240, manufactured by Tremco Ltd.
- .3 Contractors Weatherproofing Sealant (CWS) Contractors Concrete Sealant by Dow Corning.

.6 Colours of sealants and caulking when exposed in the finished work to later selection by the Consultant. Allow different colours for different situations and materials. Allow for custom colours for exterior sealants.

.7 Primers for sealing: As manufactured or recommended by the manufacturer of the sealing materials for the specific applications.

.8 Joint backing material:

.1 circular foam strips, of approved manufacture, compatible with sealant and 50% greater width than joint width;
.2 Vertical Surfaces: extruded polyolefin foam, Sof Rod by Tremco Ltd.
.3 Horizontal Surfaces: closed cell polyethylene foam, Standard Backer Rod by Tremco.

.9 Bond Breaker: pressure sensitive plastic tape backing material, which will not bond to sealant; 3M #226 or #481, or Valley Industries #40.

.10 Acoustical Sealant.
.1 To CAN/CGSB-19.21.
.2 Acceptable Product: Tremco Commercial Sealants & Waterproofing, Tremco Acoustical Sealant.

.11 Air Barrier Foam Sealant - One Part.
.1 One part polyurethane insulating foam sealant, to CAN/ULC-S710.1.
.2 Acceptable Products:
.1 Adfast Inc.: ADFOAM 1885-2
.2 Dow Chemical Canada ULC: GREAT STUFF PRO Gaps & Cracks Insulating Foam Sealant.
.3 Zerodraft Products Inc.: Zerodraft Foam Sealant.

.12 Air Barrier Foam Sealant - Two Part.
.1 Two part polyurethane insulating foam sealant, to CAN/ULC-S711.1.
.2 Acceptable Products:
.1 Dow Chemical Canada ULC: FROTH-PAK Foam Sealant.
.2 Zerodraft Products Inc.: Zerodraft Insulating Air Sealant.

.13 Preformed Compressible and Non-Compressible Back-up Materials.
.1 Polyethylene, Urethane, Neoprene or Vinyl Foam.
.1 Extruded closed cell foam backer rod.
.2 Size: oversize 30 to 50%.
.2 Neoprene or Butyl Rubber: Round solid rod, Shore A hardness 70.
.3 High Density Foam: Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200kPa, extruded polyolefin foam, 32kg/m; density, or neoprene foam backer, size as recommended by manufacturer.
.4 Bond Breaker Tape: Polyethylene bond breaker tape which will not bond to sealant.

.14 Cleaning material for surfaces to receive sealant to be as recommended by the manufacturer of the sealant.

PART 3 – EXECUTION

3.1 LOCATIONS

.1 Seal all exterior junctions and joints wherever required to close gap and wherever sealant is essential to maintain the continuity of air barrier, water barrier, or non-rated smoke separation of wall with Sealant Type A. Areas to be caulked include:
.1 Concrete to metal, masonry, concrete and precast concrete.

.2 Masonry to metal, concrete, precast concrete, and masonry.
.3 Metal to metal, masonry, concrete, and precast concrete.
.4 Around pipes and conduit through foundation walls.
.5 Between hollow metal frames and screens and adjacent materials.
.6 Between metal panels and adjacent materials.
.7 Between window and louvre frames and sills and adjacent materials.
.8 At all control and expansion joints.

.2 Seal all interior junctions and joints wherever required to close gap and wherever sealant is essential to maintain the continuity of air barrier, water barrier, or non-rated smoke separation of wall with Sealant Type B. Areas to be caulked include:

.1 Concrete to metal, masonry, concrete and precast concrete.
.2 Masonry to metal, concrete, precast concrete, and masonry.
.3 Metal to metal, masonry, concrete, and precast concrete.
.4 Around pipes and conduit through walls.
.5 Between hollow metal frames and screens and adjacent materials.
.6 Between window and louvre frames and sills and adjacent materials.
.7 At all joints between millwork and masonry, to provide neat junction.
.8 At junction between all counters and/or splashbacks and adjacent substrate with neat 3mm bead.
.9 At all control and expansion joints.

.3 Seal with Sealant Type C at the following locations:

.1 Around access panels in ceramic tile faced walls with a neat 3mm bead.
.2 Around perimeter of piping penetration at tile work.
.3 At junctions between all counter tops and/or splashbacks and adjacent substrate in washrooms, with neat 3mm bead.
.4 At junctions of lavatories, toilets, and other plumbing fixtures and adjacent substrate.

.4 Seal with Sealant Type D at all interior non-moving joints to be painted.

.5 Seal at all other vertical and horizontal joint locations with Sealant Type E.

3.2 SUPERVISION

.1 Unless specified otherwise herein comply with the recommendations and directions of the manufacturer whose materials are being used on the work.

.2 Arrange for the sealant manufacturer's technical representatives to visit the site prior to the commencement of the sealing to meet with the Contractor and the Consultant.

.3 Sealant manufacturer to visit site periodically and to provide written reports to Consultant ensuring sealant is in accordance with good trade practice, the manufacturer's recommendations and the intent of this Specification.

3.3 PROTECTION

.1 Protect installed work of other trades from staining or contamination.

3.4 PREPARATION

.1 Install sealants only when surfaces and ambient temperatures are suitable for the material used, as per manufacturer's recommendations.

.2 Clean all joints and spaces to be sealed.

.3 Ensure that surfaces are structurally sound, free from grease, chalk or other contaminants which may adversely affect the adhesion of the sealing materials. Use dry oil free clean compressed air stream if necessary to clean out the joint.

.4 Clean surfaces with a solvent or cleaner recommended by the manufacturer of the sealant materials.

.5 Remove chalk lines completely. Do not place clear sealant over coloured chalk lines.

.6 Test materials for indications of staining or poor adhesion before any sealing is commenced.

.7 Submit colour chart to Consultant and obtain his written instructions for colours and locations of colours.

3.5 PRIMING

.1 If recommended by the manufacturer of the sealing materials, prime joints to prevent staining, or to assist the bond, or to stabilize porous surfaces.

.2 Apply primer with a brush which will permit the priming of all joint surfaces.

3.6 BACKUP MATERIAL

.1 Apply bond breaker tape where required to manufacturer's instructions.

.2 Install joint back-up to achieve correct joint depth and shape, with approximately 30% compression.

3.7 MIXING

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

3.8 MASKING

.1 Where necessary to prevent contamination of adjacent surfaces, mask the areas adjacent to the joints with masking tape.

3.9 INSTALLATION

.1 Install joint backing materials at all locations as detailed or where required by sealant manufacturer's printed directions.

.2 Install a bond breaker tape or packing over asphalt impregnated fibre board as recommended by sealant manufacturer.

.3 Ensure that the correct sealant depth is maintained.

.4 Finished joints shall be free of wrinkles, sags, air pockets, ridges and embedded impurities.

.5 Tool all sealant surfaces to produce a smooth surface.

.6 Remove droppings and excess sealant as work progresses and before material sets.

.7 Sealing materials shall be gun grade or tool grade consistency to suit the joint conditions.

.8 Commence sealing only after all adjacent surfaces have been painted under Painting Section.

3.10 CLEANING

.1 Clean adjacent surfaces immediately and leave work neat and clean. Remove excess sealant and droppings using recommended cleaners as work progresses. Remove masking after joint tooling.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1	Door Hardware	Section 08 71 00
.2	Glazing	Section 08 80 00

1.2 REFERENCE STANDARDS

.1 American Architectural Manufacturers Association (AAMA):

.1	AAMA-CW-1-9	Aluminum Curtain Wall Design Guide Manual
.2	AAMA-CW-10	Curtain Wall Manual #10, Care and Handling of Architectural Aluminum From Shop to Site
.3	AAMA-GS-1	Metal Curtain Wall, Window, Store Front and Entrance Guide Specifications Manual

.2 American Society for Testing and Materials (ASTM):

.1	ASTM-A446	Specification for Sheet Steel, Zinc-Coated by the Hot-Dip Process, Structural Quality
.2	ASTM-B209	Specification for Aluminum and Aluminum-Alloy Sheet and Plate
.3	ASTM-B221	Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes
.4	ASTM E119	Standard Test Methods for Fire Tests of Building Construction and Materials.
.5	ASTM E2010	Standard Test Method for Positive Pressure Fire Tests of Window Assemblies.

.3 Canadian General Standards Board (CGSB):

.1	CAN/CGSB-12.1	Tempered or Laminated Safety Glass
.2	CAN/CGSB-19.9	Spandrel Glass
.3	CAN/CGSB-12.20	Structural Design of Glass for Buildings
.4	CAN/CGSB-19.13	Sealing Compound, One Component, Elastomeric Chemical
.5	CAN/CGSB-19.24	Curing Multi-Component, Chemical Curing Sealing Compound
.6	CAN/CGSB-51.10	Mineral Fibre Board Thermal Insulation

.4 Canadian Standards Association (CSA):

1.3 SYSTEM DESCRIPTION

.1 Glazed aluminum frame system includes thermally broken tubular aluminum sections with self-supporting framing, shop fabricated, factory prefinished, glazing, spandrel infill, related flashings, anchorage and attachment devices and aluminum angle closures at jambs.

.2 Sealants for work of this section and between work of this section and adjacent construction Supply and installation of finish hardware for work of this section.

.3 System to permit replacement of individual glass panels without necessitating removal of structural mullion sections.

.4 Design frames and doors in exterior walls to accommodate expansion and contraction within ambient temperature range of -35 to +45C. Limit deflection of mullions to maximum 1/175th of clear span when tested to ASTM-E330 under wind load of 1.2kPa. Submit certificate of tests performed.

.5 Maximum air leakage rate for exterior aluminum door and frame assemblies shall not exceed 5.1 L/sm2 at a pressure of 75Pa as determined in accordance with AAMA/WDMA/CSA 101/I.S.2/A440 or NFRC-400.

.6 Maximum air leakage rate for exterior glazed aluminum screen assemblies shall not exceed 0.3 L/sm2 at a pressure of 75Pa as determined in accordance with AAMA/WDMA/CSA 101/1.2.2/A440 or NFRC-400.

.7 Maximum overall U-factor for exterior aluminum door assemblies shall not exceed 5.23 W/m2K as determined in accordance with CAN/CSA-A440.2.

.8 No water infiltration when tested in accordance with ASTM-E331.

1.4 DESIGN

.1 Conform to requirements of Ontario Building Code and requirements of all authorities having jurisdiction.

.2 Design to provide:

.1 Resistance to pressure differentials.
.2 Adequate provisions for thermal movement without thermal fractures.
.3 Adequate provision for live and dead loads without failure, distortion or fracture.

.1	CAN/CSA-G40.21	Structural Quality Steels
.2	CAN/CSA-G164	Hot Dip Galvanizing of Irregularly Shaped Articles
.3	CSA-S136	Cold Formed Steel Structural Members
.4	CAN/CSA-S157	Strength Design of Aluminum
.5	CSA-W59.2	Welded Aluminum Construction

.4 For differential movement of structural live load deflection.
.5 Adequate support and anchorage of components taking into consideration all loading factors.

.3 Aluminum frame system to be designed to meet the requirements of the lateral design loads as required for guards and rails as specified by the Ontario Building Code. Shop drawings shall include calculations noting the above criteria has been met and shall bear the stamp of the Professional Engineer.

.4 Incorporate doors where indicated on drawings.

1.5 SUBMITTALS

.1 Submit shop drawings in accordance with Section 01 33 00 – Shop Drawings, Product Data and Submittals.
.1 Shop Drawings must be sealed by a Professional Structural Engineer, registered in the Province of Ontario.
.2 Shop drawings shall be prepared by the aluminum frame system and door manufacturer, and shall be accompanied by a letter certifying that assembled units are being supplied to the installer.
.3 Submit shop drawings for all aluminum frame system work. Show joinery techniques, provisions for horizontal and vertical expansion, glass and metal thicknesses, and framing member profiles. Identify all materials, including metal alloys, glass types, fasteners, and glazing materials. Identify all shop and field sealants by product name and locate on drawings. Show relative layout of all adjacent walls, beams, columns and slabs', all correctly dimensioned. Dimension position of glass edge relative to metal profile. Make no changes in design sight lines.
.4 Submit twice full size detail drawings indicating step-by- step fabrication and fabrication tolerances of air seal pan to mullion shoulder conditions complete with balancing leg.
.5 If requested by the Consultant, submit full size die drawings for all gaskets, and extrusions. Identify types of alloys and where they are used.

.2 Design Data:
.1 Provide framing member structural and physical characteristics, dimensional limitations, special installation requirements. Structural calculations shall bear the seal and signature of qualified Professional Engineer licensed to practice in the Province of Ontario.

.3 Shop Drawings: Submit drawings as follows:
.1 Indicate materials and details in full size scale for head, jamb and sill, profiles of components, interior and exterior trim, junction between combination units, elevations of unit, anchorage details, description of related components and exposed finishes, fasteners, and caulking.
.2 Indicate location of manufacturer's nameplates.
.3 Shop Drawings shall bear the seal and signature of a qualified Professional Engineer licensed to practice in the Province of Ontario.

.4 Submit written compatibility approval from sealant manufacture that all products in contact with the sealant are compatible.

.5 Certification:
- .1 Submit signed report and documentation, prepared by an independent CSA accredited agency, certifying compliance with specified thermal, optical, and air leakage requirements. Minimum performance grade shall be Class AW-PG 40-SHD.
- .2 Documentation shall include the following parameters for each aluminum door and exterior glazed aluminum screen system configuration:
  - .1 Air leakage rate.
  - .2 Overall coefficient of heat transfer (U-factor).
  - .3 Solar heat gain coefficient (SHGC).
  - .4 Overall visible transmittance (VT).
  - .5 Condensation resistance expressed as a Temperature Index (I).
- .3 Certification shall be based on full size sample testing and measurement or computer simulation and calculation in accordance with referenced standards.
- .4 Submit specified certification documentation together with Shop Drawings.

1.6 SAMPLES

.1 Submit samples of finishes, sealed glazing units, gaskets, tapes and sealants. Sample sizes and quantities as required by applicable CGSB Standards for testing.

.2 Submit prototype units of joint intersection of mullion and transom rail and mullion expansion joint. Each unit to be approximately 450mm x 450mm and complete with glazing, gasket tapes and sealants.

.3 Submit one 300mm by 300mm corner sample of each door type and door frame.

1.7 QUALITY ASSURANCE

.1 Aluminum frame Subcontractor must have five years experience in the installation of aluminum frame systems of the type specified, in installations of similar scope, and be approved by the manufacturer for this installation. Provide proof of experience for Consultant review.

.2 Aluminum frame manufacturer to provide letter certifying that they are supplying assembled units to the Subcontractor.

.3 Show that anchorages and structural sections are designed to withstand stresses and loads specified. Calculations must be prepared and signed by a structural engineer licensed to practice in the Province of Ontario.

.4 Erection of aluminum frame system shall be by personnel especially trained and experienced in this type of work. Have a senior qualified representative at the job to direct the various stages of operations.

.6 Provide safe and adequate equipment on the site to execute the work, hoisting, scaffolding, staging, safety protection equipment, tools, plant and other equipment required for the completion of the work.

.7 This Subcontractor must warrant the supply and installation of all Work of this Section.

1.8 TEST REPORTS

.1 Submit test reports from approved independent testing laboratory certifying that the proposed standard components of the aluminum frame system assembly meets or exceeds the performance criteria specified.

.2 Sealant Inspection and Testing:

.1 Sealant manufacturer shall review Shop Drawings and visit site to review sealant installation to ensure installation conforms to the intent of this Specification Manufacturer to forward copy of report to Consultant after each visit.

.2 Test 12% of all structural glazed units on site for adhesion in a manner recommended by sealant manufacturer

1.9 PERFORMANCE REQUIREMENTS

.1 Minimum design wind pressure, both positive and negative and acting normal to the plane of the wall, shall be in accordance with requirements of the O.B.C., Live Loads Due to Wind and all other relevant sections.

.2 Accommodate 5mm structural live load deflection and 22mm additional long term dead load deflection at the floor slab edge.

.3 For the required pressures and loads, limiting deflection and stresses are as follows:

.1 Normal to the plane of the wall, deflection of framing members shall not exceed 1/175 of span length or 9mm, whichever is less.

.2 In the plane of the wall, deflection of framing members shall not reduce the glass or panel bite below 75% of the design dimension, and shall not reduce the glass or panel edge clearance below 25% of the design dimension or 3mm whichever is greater. Restrict deflection further if required for proper assembly and fit of components.

.3 At connection points of framing members to anchors, anchor deflection in any direction shall not exceed 1.5mm. Where connection points are not clearly defined, maximum anchor deflection shall not exceed 1.5mm. Curtain wall shall not stiffen supporting structure.

.4 Provide horizontal closures for all vertical space to prevent chimney/stack effects.

.5 At 150% of design pressure, net permanent deflections of framing members must not exceed 1/1000 of span length, and components must not experience failure or gross permanent distortion. At connection points of framing members to anchors, anchor deflection in any direction shall not exceed 3mm and permanent set shall not exceed 1.5mm. Where connection points are not clearly defined, maximum anchor deflection and permanent set shall not exceed 3mm and 1.5mm respectively.

1.10 DELIVERY, HANDLING, STORAGE

.1 Adequately protect and crate all components against damage and wracking.

.2 Coordinate deliveries to comply with construction schedule and arrange ahead for strategic off the ground, under cover storage locations.

1.11 COORDINATION WITH OTHER TRADES

.1 Provide protection of installed work to prevent breaking of glass during installation of masonry, and other work.

1.12 EXTENDED WARRANTY

.1 Provide extended warranty covering aluminum frames and doors for a period of five (5) years from date of Substantial Performance of the Work.

.2 Provide extended warranty for glass units for a period of ten (10) years from date of Substantial Performance of the Work.

.3 Warrant that installation will be free of defects in materials and workmanship including:

- .1 Aluminum wall panel installation shall remain water and weather-tight at all times and fulfill all requirements of the Design Criteria and Specifications.
- .2 Finishes on aluminum will not change in colour or otherwise deteriorate.
- .3 Replacing and making good, at no extra cost, of any defects, including breakage of glass, caused by incorrect setting of glass, shims, and spacers, defective fabrication of glass units, failure to provide sufficient clearance for deflections of structural frame.
- .4 Make good damage to other work caused by defects of the work of this Section and make good such defects.

1.13 MAINTENANCE INSTRUCTIONS

.1 Provide copies of maintenance instructions, giving complete details of long-life upkeep of metal finishes and other materials, in accordance with Section 01 78 00.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

.1 Specifications and drawings are based on the products of Kawneer.

.2 Aluminum frames to be insulated double glazed units. Aluminum frames to be 51mm by 152mm nominal size, and arrangement as on the architectural drawings.

.3 Framing members for the glazed aluminum frame, shall be similar in profile and outside dimension to those detailed, to the approval of the Consultant, with wall thicknesses, gauges and reinforcement required to meet the performance standards specified herein.

.4 Aluminum doors: thermally broken with 260mm midrails and insulating double glass units. Refer to Section 08 80 00 - Glazing.

1.14 MAINTENANCE INSTRUCTIONS

.1 Provide copies of maintenance instructions, giving complete details of long life upkeep of metal finishes and other materials, in accordance with Section 01 78 00.

PART 2 – PRODUCTS

2.2 MANUFACTURERS

.1 Specifications and drawings for exterior aluminum doors are based on the products of Kawneer.

.2 Exterior aluminum doors to have double glazed insulated units. Refer to Section 08 80 00 – Glazing.

.3 Framing members for the glazed aluminum frame, shall be similar in profile and outside dimension to those detailed, to the approval of the Consultant, with wall thicknesses, gauges and reinforcement required to meet the performance standards specified herein.

.4 Aluminum doors:
- .1 Thermally broken with 260mm midrails and insulating double glass units. Refer to 08 80 00 Glazing.
- .2 Wide stile.
- .3 Vertical face dimension: 5" (127.0 mm).
- .4 Depth: 2-1/4" (57.2 mm).
- .5 Suitable for high traffic applications.

.5 Acceptable Products for Storefront Aluminum Frames at screen S-AL01:
- .1 TriFab® Versaglaze® 601UT Storefront Framing System.

.6 Acceptable Products for Exterior Aluminum Doors:
- .1 Kawneer: 500T Insulpour® Thermal Entrance.
- .2 Alumicor Limited: Thermally broken, ThermaPorte 7700.
- .3 Equivalents acceptable from Commdoor Aluminum and Oldcastle Building Envelope.
- .4 Door Hardware: Refer to door hardware list and Section 08 71 00.

2.3 MATERIALS

.1	Extruded Sections:	Extruded aluminum alloy 6063-T5 free from scratches and surface blemishes.
.2	Finish:	Clear Anodized finish to Consultant's approval except where indicated otherwise on the architectural drawings.
.3	Sheet and Plate:	1100-H14 alloy, Utility grade, minimum 3.2mm thick. Exposed material to be anodizing quality.
.4	Steel:	Conforming to CAN/CSA G40.21, type 33W hot dip galvanized with minimum coating of G90 zinc to CSA G-164.
.5	Float Glass:	Conforming to CAN/CGSB-12.3.
.6	Tempered Glass:	6mm clear tempered glass conforming to CAN/CGSB 12.1. Provide insulated double glazed tempered units at exterior screen units. Refer to 08 80 00 Glazing.
.7	Glazing Tape:	Type recommended by sealant manufacturer to be compatible with sealant.
.8	Fasteners:	Self-tapping cadmium plated steel for aluminum to aluminum contact and stainless steel for aluminum to steel contact, and where exposed to weather.
.9	Bituminous Paint	Conforming to CGSB 1-GP-108M, Type 2 and zinc chromate primer conforming to CGSB 1-GP-132M.
.10	Compressible Seal:	Type recommended by sealant manufacturer, of thicknesses required to provide 50% compression when in place. Self-extinguishing to ASTM D1692.
.11	Setting Blocks:	Type recommended by sealant manufacturer, 100mm long, wide enough to extend from stop to stop, as required.
.12	Aluminum Frame:	Silicone of type selected by manufacturer for application. Manufacturer to be Dow Corning Canada Inc., Canadian General Electric Company Limited, or Tremco. All materials to be from one manufacturer.
.13	Joint Backing:	Non-staining, non-absorbent material recommended by sealant manufacturer. Density 29 kg to 35 kg/m3. Size as required to provide 30% compression when installed. Use primer if recommended by sealant manufacturer.

2.4 FINISHES

.1 Finish all aluminum with clear anodized finish on the architectural drawings. Finish coatings to conform to AAMA-611.

.2 Finish steel clips and reinforcing steel with zinc coating to CAN/CSA-F154.

2.5 FABRICATION

.1 All mullions, glazing pressure plates, glazing caps to be aluminum or stainless steel. The use of plastic or hard rubber components other than as thermal breaks or sealants are not acceptable.

.2 Jointing and intersections of metals shall be accurately cut, fitted to a tolerance of 0.8mm in true planes with adequate concealed fastenings. Cut or mill out sections for sealant beads where required.

.3 Fabricate expansion joints between mullion sections with formed extruded aluminum internal sleeve sections, secure to permit joint function and maintain true alignment of sections.

.4 Fabricate sections to accommodate and interface with work or other sections by means of rabbets, interlocks, miscellaneous angles, trim and filler sections as required.

.5 Mullion cap shall be extruded aluminum section of wall thickness and size required.

.6 Reinforce mullions with structural steel sections where required with adequate anchorage to structure. Fill all sections with foamed-in-place insulation and close off vertical sections to avoid stack effect.

.7 Component fastenings, concealed throughout, adequate strength, stainless steel.

.8 Perform fitting and assembly of component parts in shop insofar as practicable. Work that cannot be permanently shop assembled shall be fitted, assembled, marked and disassembled to assure proper fitting in the field. Identify shop assembled components on shop drawings for location and erection at site.

.9 Fabricate all devices required for erection and adequate anchorage and attachment including but not limited to supplementary steel framing, brackets, inserts, clip angles, anchors, straps, shims, stud bolts, nuts, washers, splice plates, required to be built into or attached to the structural framing for the support of the curtain wall.

.10 Aluminum cover and shaped pieces: ensure that cover or shapes are smooth and completely free from distortion, oil canning, anchor attachment marking, surface colour variations and any other defect which will detract from the final installation. Pieces not in conformity with these requirements will be rejected for installation into finished curtain wall or required surfaces.

.11 Mortise, reinforce, drill and tap doors, frames and reinforcements to receive hardware using templates provided under Section 08 71 00 - Door Hardware.

.12 Isolate aluminum from direct contact with dissimilar metals, concrete and masonry by coating with alkali resistant bituminous paint.

.13 Coordinate with hardware supplier and make provisions for the installation of power door operators and electronic panic devices provided by Section 08 71 00 Door Hardware. Coordinate with Electrical Subcontractor and make provisions for all security door contacts.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verifying Conditions: Check structural elements and adjoining work on which work is dependent, verify governing dimensions, floor elevations, floor to floor heights, minimum clearances between curtain wall and structural frame. Confirm conditions are satisfactory before proceeding with installation.

.2 Coordinate with forces installing air/vapour barrier system. Curtain wall is to be installed in advance of the air/vapour barrier, which is to be sealed to the perimeter frames. Where delivery of curtain wall is late and air/vapour barrier has been installed first, protect unsecured pieces of the membrane that have been provided for application to frames.

.3 Commencement of erection will denote acceptance of surfaces and any subsequent faults occurring in erected work due to unsatisfactory conditions of surfaces, will be rectified as no cost to the Owner.

3.2 INSTALLATION

.1 Tolerances:

.1 Allow for dimensional tolerances and erect curtain wall members and component parts plumb, level and true to building lines, in correct relation to work of other Sections and established lines and levels indicated, within a maximum deviation of 3.2mm per 3660mm length non-cumulative.

.2 Permissible tolerance for the alignment of adjoining component sections and joints between metal components shall not exceed 0.8mm. Horizontal grid members, dead level, both directions.

.2 Anchor Assemblies:

.1 To structure, galvanized steel adjustable to permit accurate location of wall components, conforming to details on approved shop and erection drawings. Secure in positive manner after adjustment obtained to provide design requirements of anchorage. Ensure that anchor bolts, embedded components, pockets and other devices required for assembly anchorage are properly located.

.2 Execute all drilling of concrete for supplementary inserts where required. Execute all drilling, tapping and welding required for attachment of the assembly to the structure and components of the assembly.

.3 Welding shall comply with CSA W59.1 and requirements of CSA W47.1 and CSA W47.2. Correctly locate and securely attach supplementary steel reinforcing members, steel framing, brackets, inserts, clip angles, anchors, straps, shims, steel bolts, nuts, washers, splice plates required.

.3 Assembly:

.1 Joints and intersections accurately fitted in true planes, free of distortion, waves, twists, buckles or other defects detrimental to appearance or performance. Prevent damage to metal finish.

.2 Accurately position, securely anchor steel mullion reinforcement. Exercise care in assembly of split tube mullions and expansion joints to ensure joint function.

.3 Prevent damage to metal finish.

.4 Seals:

.1 Fit flexible seals, tapes, formed neoprene deflectors and gaskets at locations indicated and required to provide water and weathertight junctions. Ensure seal at end joints between lengths of material.

.2 Caulk junctions of system components to themselves and other work with sealant to maintain effective acoustical function.

.3 Clean spaces and joints to be caulked of foreign matter that would injure bond, wipe all metal surfaces to be sealed with cellulose sponges or clean rags soaked with a approved material, and wipe dry with clean cloth, prime surfaces as recommended by sealant manufacturer.

.4 Sealant beads shall have ethafoam or equal back surface form and depth shall be ½ bead width but not less than 6mm. Use pressure gun having proper sized nozzles to fit the various joint widths. Tool and finish joints. immediately clean adjacent materials which have been soiled.

.5 Install air barrier foam sealant in accordance with Section 07 92 00 Sealants.

.5 Seal perimeter frames to adjacent materials using acoustical sealant specified above.

.6 Install doors and hardware in accordance with hardware templates and manufacturer’s instructions.

.7 Adjust operable parts for correct function.

3.3 GLAZING

.1 Frames and glass shall be free from moisture, frost, dirt, cement, plaster, oil and grease.

.2 Centre glass using setting blocks and recommended glazing tape, set in accordance with manufacturer's written instructions.

3.4 CLEANING

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

.2 Refinish shop-applied finishes in field only with approval of Consultant.

.3 Clean off dirt resulting from erection on surfaces exposed to view.

.4 At all times, keep the premises free from accumulations of waste material or rubbish caused by work, and at the completion of the work, remove all rubbish and all tools, equipment and surplus materials from and about the work and leave the work clean.

.5 Replace glass broken during the course of the work.

.6 Remove, as work progresses, all excess or foreign materials or dropping which would set or become difficult to remove from wall cladding surfaces at time of final cleaning.

.7 Before building is turned over to the Owner, remove temporary protection, clean and polish exterior and exposed interior surfaces of all work of this Section. Use proper cleaning materials and methods to prevent damage to surfaces, finishes, sealers or work of other trades. Make good such damage to the satisfaction of the Consultant.

.8 Do not use steel wool, wire brushes or steel scrapers on any finished surfaces.

.9 Upon completion of work of this Section replace or make good all defective, scratched or damaged work to the Consultant's satisfaction, at no extra cost to the Owner.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

.1 Supply and installation of door hardware for exterior aluminum doors and frames and supply and installation of cylinders at all doors.

.2 Supervision and inspection of door hardware installation by hardware supplier. Contractor is to carry this cost in their base bid price.

.3 Supply and installation of automatic hardware; overhead power door operator.

.4 Final inspection and certification by hardware supplier's Architectural Hardware Consultant (AHC). Inspections are carried by the Contractor in their base bid price.

.5 Refer to attached hardware list, prepared by Group 87 Architectural Hardware Inc., for supply and installation of door hardware.

1.2 RELATED SECTIONS

1.	Aluminum Doors and Frames	Section 08 13 16
2.	Electrical	Division 26

1.3 PRODUCTS SUPPLIED BUT NOT INSTALLED IN THIS SECTION

.1 Power supplies, compressor/control boxes, junction boxes installed by Division 26.

1.4 REFERENCES.

1.	CAN/CGSB-69.17-M	Bored and Pre-assembled Locks and Latches
2.	CAN/CGSB-69.18-M/ANSI/BHMA-A156.1	Butts & Hinges
3.	CAN/CGSB-69.19-M/ANSI/BHMA-A156-3	Exit Devices
4.	CAN/CGSB-69.20-M/ANSI/BHMA-A156-4	Door Controls (Closers)
5.	CAN/CGSB-69.29/ANSI/BHMA-A156-13	Mortise Locks & Latches
6.	CAN/CGSB-69.34/ANSI/BHMA-A156.18	Materials & Finishes
7.	Canadian Steel Door & Frame Manufacturers Association (CSDFMA), Canadian Metric Guide for Steel Doors & Frames (Modular Construction	
8.	NFPA 80-Standard for Fire Doors and Windows	
9.	Door and Hardware Institute	Recommended locations for Architectural Hardware for Standard Steel Doors and Frames
10.	Door and Hardware Institute	Recommended locations for Architectural Hardware for Flush Wood Doors
11.	Door and Hardware Institute	Sequence Format for Hardware Schedule
12.	Door and Hardware Institute	Key Systems and Nomenclature
13.	Door and Hardware Institute	Abbreviations and Symbols used in Architectural Door and Hardware Schedules and Specifications,

14. Door and Hardware Institute — Installation Guide for Doors and Hardware

1.5 GENERAL REQUIREMENTS

.1 Hardware shall comply with requirements of authorities having jurisdiction.

.2 Hardware for doors in fire separations and exit doors shall be certified by a Canadian Certification Organization accredited by the Standards Council of Canada.

.3 All door closers shall have back checking features and shall be of proper size to operate door efficiently.

.4 Confirm all kick plate and threshold sizes before ordering them.

.5 Exposed screws for installing hardware shall have Phillips or Robertson heads.

.6 Rim panic device strikes shall be mortise type application. Equip panic devices with six bolts.

.7 Confirm degree of swing for door holders, closers, etc.

1.6 SUBMITTALS

.1 Door and Hardware List:

.1 Submit one digital copy of a detailed final door hardware list with product data sheets, as described below, all prepared by a qualified Architectural Hardware Consultant.
.2 List all items to be furnished and delivered under this section.
.3 Indicate door hardware proposed, identifying each item by manufacturer name, manufacturer's catalogue model number, material, function, finish, location, and other pertinent information.
.4 The list shall be in the same format as the door hardware list included at the end of this specification section.
.5 Approval of the Final Door Hardware List by the Consultant and the Owner shall not relieve the Contractor from responsibility for providing all required door hardware.

.2 Product Data:

.1 Product data sheets to include a finish hardware schedule showing all items of hardware to be used on the project. Identify each hardware item supplied under this section by product number, function, hand & finish. Finish hardware schedule to be in conformance of door and Hardware Institute Standards. Catalogue cuts and other data are required to identify individual components listed and/or to demonstrate compliance with specified requirements for all items contained in the finish hardware set. Submission of manufacturer's full line brochure is not acceptable.

.3 Samples:

.1 When requested in writing, provide (to the Consultants Site Office) one sample of each hardware item complete with fasteners, within fifteen (15) calendar days of award of a purchase order. Samples to be clearly labelled with their hardware schedule designation, installation location, and manufacturers' name and model number. Samples will be returned; approved samples may be incorporated into the work.

.2 Substitute new samples for those rejected by the Consultant.

.3 Do not supply door hardware to the site until all samples are approved by the Consultant.

.4 Templates:

.1 Furnish templates within ten (10) calendar days of being requested by the Consultant and/or door & frame manufacturer, the Contractor must submit templates for door and frame preparations and/or mounting of finish hardware items, and identify each template by label indicating applicable specification paragraph number, brand name & number, door number & hardware package number.

.5 Keying Schedule:

.1 Provide digital copy of keying schedule for review prepared and detailed in Reference 1.5.5. Include all special keying notes and stamping instructions. Locks and cylinders are not to be ordered until the key schedule has been approved by the owner.

.6 Wiring Diagrams:

.1 Furnish a written description of the functional use of all electrical hardware. Include door and frame elevations showing the location of each item of electrical hardware to be installed, including a diagram showing number and size of all conductors. Include drawings showing all terminal connections.

.7 Operations and Maintenance Data:

.1 Prior to Substantial Performance, provide the following information for inclusion in the Maintenance manuals, in accordance with Section 01 78 00, Closeout Submittals:

.1 Name of hardware distributor, address and contact name
.2 Copy of final "as-built" finish hardware schedule
.3 Wiring diagrams, elevations, risers, point to point
.4 Copy of final keying schedule
.5 Copy of floor plans with keying nomenclature assigned to door numbers as per the approved keying schedule
.6 Maintenance instructions for each product
.7 Catalogue cut sheets and product specifications for each product
.8 Parts list for each product
.9 Installation instructions for each product
.10 A copy of the certification letter from the AHC, confirming the correct supply and installation of hardware, as required by Subsection 3.3, below.

.8 Maintenance Materials:

.1 Provide maintenance materials, in accordance with Section 01 78 00, Closeout Submittals.
.2 Supply four sets of wrenches for door closers, locksets, latchsets, and exit devices.
.3 Supply five sets of other special parts or tools required for proper maintenance and adjustment of door hardware, including those used for locks/passage/privacy, all type of door closers, and all exit devices.

1.7 QUALITY ASSURANCE

.1 Contractor shall coordinate a hardware pre-installation meeting with hardware installer, hardware supplier and hardware sub-consultant (original hardware specifier). Review installation procedures with the hardware suppliers.

.2 Supplier and installer shall hold regular review meetings as required (at least every second week) during the installation period. Submit minutes of meetings to the Consultant.

.3 Contractor is to carry inspections to be completed by the hardware consultant, of the hardware installation, in their base bid price.

.4 Substitutes:

.1 Only approved products specified will be accepted. Make substitution request in accordance with Division 01. Include product data and indicate benefit to the project.

.5 Supplier Qualifications:

.1 Successful hardware distributor to have a minimum of five (5) years experience in the door and hardware industry. The distributor to have on staff an Architectural Hardware Consultant (A.H.C.) who will be responsible for scheduling, detailing, ordering and co-ordination of the finishing hardware for this project. This individual shall be required for job-site visits, as outlined below and when so requested by the Architect. Provide proof of experience for review by Consultant.

.6 Designated Installer:

.1 Hardware Installers must have a minimum of five (5) years experience in installation of hardware. Provide verification of installer's qualification to Consultant for approval. All installers to attend review meetings with the Hardware Distributor. Provide proof of experience for review by Consultant.

1.8 PRODUCT DELIVERY, STORAGE AND HANDLING

.1 Marking and Packaging:

.1 All cartons shall be marked with heading number, door number, and key-set symbol where applicable in original packaging provided by the manufacturer. Pack packaged hardware in suitable wrappings and containers to protect it from damage during shipping and storage. Accessories, fastening devices and other loose items shall be enclosed with each applicable item of hardware.

.2 Delivery:

.1 Deliver hardware to those who are to install it, complete with keys, templates and installation instructions together with all required screws, expansion shields, anchors, jigs and other related accessories for satisfactory attaching or installing hardware.

.3 Storage:

.1 Store in a clean, dry room with lockable man door and adequate shelving to permit organization so item numbers are readily visible.

1.9 WARRANTY

.1 Provide warranties by the accepted manufacturers:

Hardware Item	Length of Warranty
Mortise Hinges	Lifetime
Locks (ND-Series)	7 yrs
Locks (All other Series)	2 yrs
Exit Devices	3 yrs
Door closers -mechanical	10 yrs
Door Operators - Electro mechanical	2 yrs
Door Hold open Devices - Electro mechanical	2 yrs
Overhead stops/holders	2 yrs
Floor/Wall stops	2 yrs
Electric Strikes/Key Switches/Power Supplies	2 yrs

.2 Where manufacturer’s standard warranty period exceeds these requirements, it shall prevail.

.3 Door hardware warranties shall cover all defects in material and workmanship that become apparent during the warranty period and such defects shall be made good or the defective product shall be replaced, to the satisfaction of the Owner and at no cost to the Owner.

1.10 MAINTENANCE

.1 Maintenance Service:

.1 After the building is occupied arrange an appointment with the Owner’s maintenance staff for instruction of proper use, servicing, adjusting and lubrication of hardware furnished. Submit to the consultant a list of attendees and meeting date.

.2 Extra Materials:

.1 Provide Owner with maintenance materials as specified above.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

.1 Refer to attached hardware list, prepared by Group 87 Architectural Hardware Inc., for supply and installation of door hardware.

2.2 MATERIALS

.1 Refer to attached hardware list, prepared by Group 87 Architectural Hardware Inc., for supply and installation of door hardware.

.2 Screws and Fasteners:

.1 All screws shall be matching finish to their product and shall be manufacturer's standard. Door closers, door holders and exit devices installed on fire rated wood doors and hollow metal doors shall be attached with sex nuts and bolts.

2.3 FINISHES

.1 Unless otherwise specified, all finishes to be brushed chrome (626).

.2 Finishes are specified as follows:

ITEM	BHMA#	DESCRIPTION	BASE MATERIALS
Hinges	652	satin chrome plated	steel
Lock Trim	626	satin chrome plated	brass/bronze
Exit Devices	626	satin chrome plated	brass/bronze
Door Closer	689	powder coat aluminum	steel
Magnetic Wall Holders	689	powder coat aluminum	steel
Door Pulls	630	satin stainless steel	stainless steel
Protective Plate	630	satin stainless steel	stainless steel
Door Stops/Holders			
Overhead	630	satin stainless steel	stainless steel
Wall/Floor	626	satin chrome plated	brass/bronze
Thresholds	628	Anodized aluminum	aluminum
Miscellaneous			
Mullions	689	powder coat aluminum	steel
Electric Strikes	630	satin stainless steel	stainless steel

2.4 CYLINDERS, KEYING SYSTEMS AND KEY CONTROL

.1 Meet with the Owner to finalize keying requirements and obtain keying instructions in writing as outlined in Division 01.

.2 Permanent cylinders to be keyed by factory, combined in sets or subsets, master keyed or great grand master keyed, as directed by Owner.

.3 Furnish keys in following quantities, furnish a sum total of three (3) change keys per cylinder. This sum total of keys to be cut and furnished as directed by Owner. Any unused balance of cut change keys shall be furnished as key blanks directly to Owner with the cut Keys.

.4 All keying requirements to be confirmed by Owner.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Ensure that doors and frames are properly prepared and reinforced to receive finish hardware prior to installation.

.2 Ensure that door frames and finished floor are sufficiently plumb and level to permit proper engagement and operation of hardware.

.3 Submit in writing a list of deficiencies, determined as part of inspection required, to supervising consultant prior to installation of finished hardware.

3.2 INSTALLATION

.1 Hardware Installers must have a minimum of five (5) years experience in installation of hardware. Provide verification of installer's qualification to Consultant for approval. All installers to attend review meetings with the hardware distributor.

.2 Install hardware at mounting heights as specified in the manufacturers templates or specific references in approved hardware schedule or approved elevation drawings.

.3 Where mounting height is not otherwise specified, install hardware at mounting heights as per referenced standards.

.4 Install hardware using only manufacturer supplied and approved fasteners in strict adherence with manufacturers published installation instructions.

.5 Ensure that all locksets / latchsets / deadlocks are of the correct hand before installation to ensure that the cylinder is in the correct position. Handing is part of installation procedure.

.6 Ensure that all exit devices are of the correct hand and adjust device cam for proper outside trim function prior to installation. Handing is part of installation procedure.

.7 Follow all manufacturer's installation instructions. Adjustment is inclusive of spring power, closing speed, latching speed and back-check at the time of installation.

.8 Delayed action door closers are to be adjusted to forty (40) second delay for handicapped accessibility and movement of materials. Time period to be approved by Owner.

.9 Install head seal prior to installation of “PA”-parallel arm mounted door closers and push side mounted door stops/holders. Trim, cut and notch thresholds and saddles neatly to minimally fit the profile of the door frame. Install thresholds and saddles in a bed of caulking completely sealing the underside from water and air penetration.

.10 Counter sink through bolt of door pull under push plate during installation.

.11 Install blocking material of sufficient type and size in cavities of metal and wood stud walls and partitions. Located concave and convex type door bumpers at the appropriate height to properly contact protruding door trim.

3.3 FIELD QUALITY CONTROL

.1 Verify each door leaf opens closes and latches properly. Inspect fire rated openings to ensure they are installed in compliance with NFPA 80 requirements. Test access control system and electrified hardware devices for proper operation, owner to sign off on verification of operation. Verify electric door release hardware operates properly upon activation of the fire alarm system.

.2 Finishing Hardware supplier’s Architectural Hardware Consultant shall perform on-site inspections every two weeks during hardware installation and provide inspection reports listing progress of work, unacceptable work and corrective measures. Repair or replace as directed by the Consultant.

.3 Upon completion of finish hardware installation, the Architectural Hardware Consultant and the Contractor shall inspect work and provide a list of all hardware deficiencies. The Architectural Hardware Consultant shall re-inspect when notified by the Contractor as to the clearing of deficiencies. Final inspection must ensure all hardware items operate as per manufacture requirements. Coordinate inspections with manufacturer’s representatives as required to establish warranties.

.4 Once any deficiencies have been corrected, the Architectural Hardware Consultant and the Contractor shall certify in writing that all hardware items and their installation are in accord with requirements of Contract Documents.

3.4 ADJUSTING AND CLEANING

.1 Check and make final adjustments to each operating item of hardware on each door to ensure proper operation and function.

.2 Adjust doors with self closing devices or automatic closing devices for proper operation after the HVAC system is balanced and adjusted. Verify spring power of non-sized door closers is properly adjusted.

.3 All hardware to be left clean and free of disfigurements.

.4 Instruct Owner's personnel in the proper operation, adjustment and maintenance of hardware.

.5 Check all locked doors against approved keying schedule.

3.5 PROTECTION

.1 Protect hardware from damage during construction. Wrap locks panic hardware, fire exit hardware, door pull trim with kraft paper or plastic bubble materials to protect finish from damage until date of substantial completion. Remove and reinstalling or where necessary, using temporary hardware to maintain finish in new condition and maintain manufacturer's warranty.

END OF SECTION

FINISHING HARDWARE SPECIFICATION

FOR

WATERDOWN HIGH SCHOOL

MAIN ENTRANCE REPLACEMENT

215 PARKSIDE DRIVE

WATERDOWN, ON

ARCHITECT: WARD 99 ARCHITECTS INC.
7611 PINE VALLEY DRIVE, UNIT 11
VAUGHAN, ON

CONTRACTOR:

SUPPLIER:

GROUP 87

ARCHITECTURAL HARDWARE INC.

UNIT #1 – 3245 HARVESTER RD,
BURLINGTON, ONT. L7N-3T7
PH# 905-639-4676
FAX# 905-639-7561
E-MAIL: glen@group87.ca
WEB: www.group87.ca

CONSULTANT: **GLEN C. WIKKERINK**

DATE: April 2, 2025
REVISION:

LEGEND

AL	ALUMINUM
CLSR	CLOSER
DR	DOOR
DS	DEAD STOP
HLDR	HOLDER
HM	HOLLOW METAL
HW	HEAVY WEIGHT
LBR	LESS BOTTOM ROD
MNT	MOUNT
MTG	MOUNTING
NRP	NON REMOVABLE PIN
P.A.	PARALLEL ARM
WD	WOOD

FINISHES

15/652	SATIN NICKEL
28	ANODIZED ALUMINUM
26D/ 626	SATIN CHROME
32D/630	SATIN STAINLESS STEEL
689	ALUMINUM PAINTED
AL	ALUMINUM
PT	PRIMED FOR PAINT

MANUFACTURERS

HINGES	IVES
EXIT DEVICES	VON DUPRIN
CLOSERS	LCN
OVERHEAD STOPS	GLYNN JOHNSON
DOOR PULLS	CBH
WEATHERSTRIPPING	K.N. CROWDER
AUTO OPERATORS	HORTON

Heading 01 (HwSet)

		Hand	Degree Act	Degree InAct
1 PR	DOOR(S) D1000A EXTERIOR FROM VESTIBULE 1001 1/980 1/885 x 2150 x 51 x ALD x ALF x NON-RTD Opening Remark: UNEQUAL LEAVES	LHRA/RHRI	90	90

Totals			Each Assembly to have:				Act	InAct
(2)	2	EA	CONTINUOUS HINGE	027XY X 2108 51MM DR.	628	IVE	1	1
(1)	1	EA	FIXED MULLION	BY ALUMINUM FRAME SUPPLIER				
(1)	1	EA	EXIT DEVICE	CD35A-EO 915MM *CYL DOG. C/W 299 STK	626	VON		1
(1)	1	EA	EXIT DEVICE	CD35A-NL-OP 1220MM *CYL DOG.	626	VON	1	
(1)	1	EA	RIM CYL. HOUSING	20-079	626	SCH	1	
(2)	2	EA	MORT. CYL. HOUSING	26-094 X XQ11-948 *CYL. DOGGING	626	SCH	1	1
(3)	3	EA	PERMANENT CORE	23-030 S123 '1' BITTED	626	SCH	2	1
(1)	1	EA	ELECTRIC STRIKE	6300	630	VON	1	
(2)	2	EA	DOOR PULL	3015-2 #2 51MM DR.	32D	SMH	1	1
(1)	1	EA	TJ CLOSER	4021	689	LCN		1
(1)	1	EA	ADAPTER PLATE	4020-18G	689	LCN		1
(1)	1	EA	AUTO OPERATOR	7900	CL	HOR	1	
(2)	2	EA	OVERHEAD STOP	104S	630	GLY	1	1
(1)	1	EA	SWEEP	W-24S 1220MM	CL	KNC	1	
(1)	1	EA	SWEEP	W-24S 915MM	CL	KNC		1
(1)	1	EA	THRESHOLD	CT-10 1220MM	627	KNC	1	
(1)	1	EA	THRESHOLD	CT-10 915MM	627	KNC		1
(1)	1	EA	INTEGRATION BOX	TA2902G3 E-CR-AO		KMT	1	
(1)	1	EA	ACTUATORS	RE-USE EXISTING			1	
(1)	1	SET	WIRING DIAGRAMS	AS REQUIRED		G87		
(1)	1	EA	INSTALLATION	AUTO OPERATOR		G87	1	

120V TO HEAD OF FRAME & LOW VOLTAGE WIRE BY ELECTRICAL CONTRACTOR.
RE-USE EXISTING ADO ACTUATORS.
RE-USE EXISTING ACCESS CONTROL.

Heading 02 (HwSet)

		Hand	Degree Act	Degree InAct
1 PR	DOOR(S) D1000B EXTERIOR FROM VESTIBULE 1001 2/885 x 2150 x 51 x ALD x ALF x NON-RTD Opening Remark: BOTH LEAVES ACTIVE	LHR/RHR	90	90

Totals			Each Assembly to have:				Act	InAct
(2)	2	EA	CONTINUOUS HINGE	027XY X 2108 51MM DR.	628	IVE	1	1
(1)	1	EA	FIXED MULLION	BY ALUMINUM FRAME SUPPLIER			1	1
(2)	2	EA	EXIT DEVICE	CD35A-EO 915MM *CYL DOG. C/W 299 STK	626	VON	1	1

Heading 02 (HwSet) Continued.....

						Hand	Degree Act	Degree InAct
(2)	2	EA	MORT. CYL. HOUSING	26-094 X XQ11-948 *CYL. DOGGING	626	SCH	1	1
(2)	2	EA	PERMANENT CORE	23-030 S123 '1' BITTED	626	SCH	1	1
(2)	2	EA	DOOR PULL	3015-2 #2 51MM DR.	32D	SMH	1	1
(2)	2	EA	TJ CLOSER	4021	689	LCN	1	1
(2)	2	EA	ADAPTER PLATE	4020-18G	689	LCN	1	1
(2)	2	EA	OVERHEAD STOP	104S	630	GLY	1	1
(2)	2	EA	SWEEP	W-24S 915MM	CL	KNC	1	1
(2)	2	EA	THRESHOLD	CT-10 915MM	627	KNC	1	1
(2)	2	EA	WEATHERSTRIPPING	BY ALUMINUM DOOR SUPPLIER			1	1

End of Schedule

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Glazing for exterior storefront framed glazed screen and exterior doors.

1.2 RELATED SECTIONS

.1	General Requirements	Division 01
.2	Sealants	Section 07 92 00
.3	Aluminum Doors and Frames	Section 08 13 16

1.3 REFERENCES

.1 ASTM-D2240, Standard Test Method for Rubber Property-Durometer Hardness.
.2 ASTM-E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
.3 ASTM-E330, Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
.4 CAN/CGSB-12.1, Tempered or Laminated Safety Glass.
.5 CAN/CGSB-12.3, Flat, Clear Float Glass.
.6 CAN/CGSB-12.8, Insulating Glass Units.
.7 CAN/CGSB-12.9, Spandrel Glass.
.8 CAN/CGSB-12.11, Wired Safety Glass.
.9 CAN/CGSB-12.20, Structural Design of Glass for Buildings.
.10 CAN/CGSB-19.13, Sealing Compound, One-Component, Elastomeric Chemical Curing.
.11 CAN/CSA-A440.2-0 Fenestration Energy Performance.
.12 Insulating Glass Manufacturers Alliance (IGMA), Glazing Guidelines for Sealed Insulating Glass Units, 1997.
.13 Glass Association of North America (GANA), Glazing Manual, 2005.
.14 NFRC-100, Procedure for Determining Fenestration Product U-Factors.
.15 NFRC-200, Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.
.16 NFRC-400 Procedure for Determining Fenestration Product Air Leakage.

1.4 QUALITY ASSURANCE

.1 Glass and glazing work of this section shall conform to good glazing practice as described in the IGMA-North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use and the GANA Glazing Manual.

.2 Submit all documentation specified to show that all Products used meet or exceed the requirements of these Specifications.

.3 All glass shall bear manufacturer's labels identifying glass type and thickness. Labels shall remain on glass until final cleaning.

.4 Insulating glass manufacturer shall be a member in good standing of IGMA, and be prepared to submit evidence of current membership to the Consultant on demand.

.5 Glazing Subcontractor shall be member in good standing of the Architectural Glass & Metal Contractors Association or the Ontario Glass & Metal Association, and have a minimum of five years uninterrupted experience in successfully carrying out projects of similar size.

.6 Energy performance calculations shall be prepared by qualified practitioners who are prepared to submit evidence of their training and qualifications on demand.

.7 Engage a Registered Professional Engineer licensed to practice in the province of Ontario to:

- .1 Design the glass and glazing to meet the specified structural performance criteria in addition to the minimum requirements of the Ontario Building Code.
- .2 Supervise the preparation of Shop Drawings and erection drawings.
- .3 Carry out shop and field reviews to ensure the work complies with those drawings and with the structural performance criteria.
- .4 The cost of the above engineering, inspections and letters shall be included as part of the cost for work under this section.

1.5 PERFORMANCE REQUIREMENTS

.1 Structural Design of Glass:

- .1 Glass thickness:
  - .1 Specified glass thicknesses are minimums.
  - .2 Confirm glass thicknesses by analyzing Project loads and in-service conditions.
  - .3 Provide glass lights in the thicknesses required to meet or exceed these requirements, but not less than the minimum thickness specified.
- .2 Size glass units and glass thickness in accordance with CAN/CGSB-12.20.
- .3 Size glass to withstand wind loads, dead loads and positive and negative live loads as measured in accordance with ASTM-E330.
- .4 Limit glass deflection to 1/175 of span to a maximum of 15mm with full recovery of glazing materials.
- .5 Probability of Breakage:
  - .1 Vertical glazing – typical: 8 lights per 1000 for lights set vertically or not more than 15 degrees off vertical.
  - .2 Sloped glazing: 1 light per 1000 for lights set greater than 15 degrees off vertical.
  - .3 Glazing acting as guard: 1 light per 1000.
- .6 Design exterior and interior glass lights to withstand OBC design loads for guards for glazing that extends to less than 1070mm above the floor and where the floor

level on one side is more than 600mm higher than the elevation of the floor or ground on the other side.

.2 Thermal and Optical Performance:
- .1 Maximum centre-of-glass U-factor values for glazing Products shall be as specified in Part 2 of this section and shall be determined in conformance with CAN/CSA-A440.2 and NFRC-100.
- .2 Maximum solar heat gain coefficient (SHGC) and minimum visible transmittance (VT) for glazing Products shall be as specified in Part 2 of this section and shall be determined in conformance with CAN/CSA-A440.2 and NFRC-200.

1.6 SUBMITTALS

.1 Submit in accordance with Section 01 33 00 – Shop Drawings, Product Data and Samples.

.2 Submit all documentation and samples for review by Consultant at one time, prior to ordering glass products.

.3 Certification:
- .1 Submit signed report and documentation, prepared by an independent CSA accredited agency, certifying compliance with specified thermal, optical, and air leakage requirements.
- .2 Documentation shall include the following parameters for each exterior glazing system configuration:
  - .1 Centre-of-glass coefficient of heat transfer (U-factor).
  - .2 Solar heat gain coefficient (SHGC).
  - .3 Visible transmittance (VT).
- .3 Certification shall be based on full size sample testing and measurement or computer simulation and calculation in accordance with referenced standards.
- .4 Submit specified certification documentation together with Shop Drawings.

.4 Shop Drawings:
- .1 Submit Shop Drawings for the work of this section.
- .2 Shop Drawings shall include glass type, thicknesses, sizes, shapes, accessories, locations, and glazing methods.
- .3 Shop Drawings shall include a glazing schedule listing glass types and thicknesses for each size opening and location.
- .4 Shop Drawings shall identify the insulating glass unit (IGU) supplier.
- .5 Shop Drawings shall bear the seal and signature of the Professional Engineer providing glazing design for the Glazing Subcontractor.
- .6 Submit a General Review Commitment Certificate for the work of this section as may be required by the municipality or any authority having jurisdiction.
- .7 Letter of Compliance: Submit the necessary documentation indicating compliance with the requirements of the Building Code and the approved drawings which formed the basis of the General Review Commitment Certificate.

.5 Samples:

.1 Submit samples of spandrel glass colours for selection by the Consultant. Submit 300mm by 300mm size samples of each type of glass specified.

.6 Product Data:

.1 Submit Product data for the work of this section.

.2 Provide the manufacturer's transmittance, reflectance, and thermal performance data for insulating glass units.

.3 Submit letter from insulating glass fabricator stating current IGMA compliance number and identifying the types of edge construction covered by that number.

.4 Manufacturers' certification:

.1 The respective manufacturers of specified glass products shall submit with the window and curtain wall assembly Shop Drawings, written certification stating that all glass and glazing materials and requirements as detailed and specified on the Shop Drawings have been reviewed and approved for use relative to their specific application, dimensional design and profile parameters, and conformance to all requirements as detailed and as specified in the Drawings and Specifications.

.2 Certification shall indicate the Shop Drawings reviewed by enumerating sheet number, dates and revisions.

.3 Identify any specified requirements that are in error or cannot legitimately be met, and provide alternates that meet the intent of the Specifications for the Consultant's approval.

1.7 SITE CONDITIONS AND COORDINATION

.1 Do not install any glazing until all nearby welding, grinding, sandblasting, waterproofing, mortar work and acid etching are complete.

.2 Schedule activities such as welding, sandblasting and grinding of steel or concrete, mortar work, acid etching and any other work harmful to glass, to be completed before start of glass installation. When such activities must be carried out in the vicinity of stored or installed glass, provide hoarding or other suitable protection recommended by Glazing Subcontractor.

.3 Report to the Consultant in writing any defects in existing work, or unsatisfactory site conditions. Start no work until conditions are satisfactory. Starting work shall imply acceptance of existing conditions and surfaces.

.4 Glaze with compounds, sealants, or tapes only when glazing surfaces are at temperatures recommended by the tape or sealant manufacturer, and when the substrates are free of moisture.

.5 When temperature of glazing surfaces is below that recommended by sealant manufacturer, obtain Consultant's approval for glazing methods and protective measures which are to be used under these conditions.

.6 Cooperate with other Subcontractors and with framing Supplier(s) to ensure the work of this section is completed as specified.

1.8 WARRANTY

.1 Warranty all glass to be free from defects in workmanship and materials of any kind for a period of ten (10) years.

.2 Replace (including removal and installation) all glass found to be defective.

PART 2 – PRODUCTS

2.1 MATERIALS

.1 Float Glass:
- .1 Conform to CAN/CGSB-12.3, Annealed glazing quality.
- .2 6mm thick unless specified or indicated otherwise and 9.5mm thick where glass units span more than 1220mm in width.

.2 Tempered Safety Glass (TGL):
- .1 Type 2 – tempered.
- .2 Class B – Float glass.
- .3 Category 1.
- .4 Minimum 6mm thick clear tempered glass conforming to CAN/CGSB 12.1. Provide minimum 9.5mm thick clear tempered class conforming to CAN/CGSB 12.1 where glass units span more than 1220mm in width.

.3 Sealed Insulated Glazing (IGU) at aluminum storefront framing and doors:
- .1 Insulating glass units shall be IGMAC certified and labeled.
- .2 IGU Seal: dual seal comprised of polyisobutylene primary seal with a secondary seal of silicone, butyl, polysulphide, or urethane.
- .3 IGU Spacers: warm-edge spacer, comprised of rolled stainless steel and integral desiccant. Thermal conductivity of the spacer shall not be greater than 13.63 W/m·K.
- .4 Insulating Glass Units (IGU): to CAN/CGSB-12.8, double unit, 25mm minimum overall thickness.
  - .1 Glass: to CAN/CGSB-12.1.
  - .2 Glass thickness (minimum): 6mm each light.
  - .3 Inner-cavity space thickness: 13mm, 90% Argon/10% air-filled.
  - .4 Outer Pane: Tempered safety glass with low “E” coating on glass surface number 2, clear.
    - .1 AGC Flat Glass North America Ltd.: Comfort Ti-AC 36.
    - .2 Cardinal Glass Industries: LoĒ2-272.
    - .3 Guardian Industries: Sunguard Super Neutral 68.
    - .4 PPG Canada Inc.: Solarban 60.
- .5 Inner Pane: Tempered safety glass, clear.

.6 U-V Transmittance: maximum 32%.
.7 Visible Transmittance (VT): minimum 65%.
.8 Total Solar Energy Transmittance: maximum 35%.
.9 Total Solar Energy Reflectance: minimum 29%.
.10 Shading Coefficient (SC): maximum 0.46.
.11 Solar Heat Gain Coefficient (SHGC): maximum 0.40.
.12 Light to Solar Gain (LSG): minimum 1.75.
.13 Coefficient of Heat Transfer – U-factor (W/m2$K):
.1 Winter nighttime: maximum 1.42.
.2 Summer daytime: maximum 1.25.

.4 Setting Blocks: Neoprene, 80 - 90 Shore A durometer hardness to ASTM-D2240, to suit glazing method, glass light weight and area.

.5 Spacer Shims: Neoprene 50 - 60 Shore A durometer hardness to ASTM-D2240, 75mm long by one half height of glazing stop by thickness to suit application. Self-adhesive on one face.

.6 Glazing Tape: Preformed butyl compound with integral resilient tube spacing device, 10 - 15 Shore A durometer hardness to ASTM-D2240; coiled on release paper; size to suit glazing method, black colour.

.7 Sealant: One-part neutral cure silicone to CAN/CGSB-19.13, custom colour selected by the Consultant.
.1 Dow Corning Corporation: 795 Silicone Building Sealant.
.2 General Electric Canada Inc.: Silpruf Sealant.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Ensure fabricated glass will fit openings and that all required clearances to framing will be maintained.

.2 Clean contact surfaces with solvent and wipe dry.

.3 Seal porous glazing channels or recesses with substrate compatible primer or sealer.

.4 Prime surfaces scheduled to receive sealant. Ensure surfaces are free of moisture and frost.

.5 Contractor shall take all precautions necessary to protect materials, before and after installation, from lime, mortar, water run-off from concrete or copper, careless handling of tools, weld spatter, acids, roofing tar, solvents, abrasive cleaners, and other items that could damage the glass surfaces. Do not rely on use of protective plastic films to protect materials.

3.2 INSTALLATION – GENERAL

.1 Install all materials according to manufacturers' instructions and reviewed Shop Drawings and best practices as described in IGMA and GANA glazing manuals. Ensure each material used is compatible with the material which it contacts.

.2 Adjust operating sash before glazing. Glaze operating sash in the closed position. Sash to remain closed, and not be opened by any trade, until glazing materials have properly cured.

.3 Provide specified edge and face clearances and glass bite.

.4 Ensure all vent and weep holes and passages remain free of obstructions.

.5 Follow sealant manufacturer's recommendations for proper joint design, including use of joint fillers, primers, and bond breakers, as required to suit jobsite conditions.

.6 Remove excess glazing and sealant compounds, dirt, and other substances from glass and adjacent surfaces at completion of glazing work.

.7 Provide safety markings to installed glass by attaching streamers or tape to face of sash. Do not apply tape directly to the glass. Do not mark glass with paint or any other substance that is hard to remove or could leave permanent stains.

.8 Replace all defective glass products and glass damaged during installation at no cost to the Owner.

3.3 INSTALLATION: EXTERIOR DRY METHOD (PREFORMED TAPE AND GASKET)

.1 Glaze in accordance with window manufacturer's standard methods and as specified here.

.2 Cut glazing tape to length and set against permanent stops, 6 mm below sight line. Seal corners by butting tape and dabbing with sealant.

.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 with sufficient pressure to attain full contact at perimeter of glass unit.

.5 Install removable stops with gasket inserted between glazing and applied stops.

3.4 INSTALLATION: EXTERIOR WET/DRY METHOD (PREFORMED TAPE AND SEALANT)

.1 Cut glazing tape to length and set against permanent stops, 6mm 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 ¼ points, with edge block maximum 150mm from corners.

.4 Rest glazing on setting blocks and push against tape and heel head of sealant with sufficient pressure to attain full contact at perimeter of light or glass unit.

.5 Install removable stops with spacer strips inserted between glazing and applied stops 6mm below sight line.

.6 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, maximum 9mm below sight line.

.7 Apply cap head of sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.5 INSTALLATION: EXTERIOR- WET METHOD (SEALANT AND SEALANT)

.1 Place setting blocks at ¼ points and install glazing light or unit.

.2 Install removable stops with glazing centered in space by inserting spacer shims both sides at 600mm intervals, 6mm below sight line.

.3 Fills gaps between glazing and stops with sealant to depth of bite on glazing, maximum 9 mm below sight line to ensure full contact with glazing and continue air and vapour seal.

.4 Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.6 INSTALLATION: EXTERIOR- DRY METHOD (GASKET AND GASKET)

.1 Glaze in accordance with aluminum door, entry screen and curtain wall manufacturer’s standard method.

3.7 INSTALLATION: INTERIOR - DRY METHOD (TAPE AND TAPE)

.1 Cut glazing tape to length and set against permanent stops, projecting 1.5mm above sight line.

.2 Place setting blocks at 1/3 points, with edge block maximum 150mm from corners.

.3 Rest glazing on setting blocks and push against tape for full contact at perimeter of light or unit.

.4 Cut glazing tape to length and place glazing tape on free perimeter of glazing, projecting 1.5 mm above sight line.

.5 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

.6 Knife trim protruding tape.

3.8 PROTECTION

.1 Contractor shall take all precautions necessary to protect stored glass and installed glass, from lime, mortar, water run-off from concrete or copper, weld spatter, acids, roofing tar, solvents, abrasive cleaners, careless handling of tools, and any other activities by building trades that could permanently damage the glass surfaces.

.2 Install protective cover to glazing where there is a high risk of damage. Use plywood, heavy Kraft paper or non-staining transparent plastic sheet. Do not let protective materials contact surface of glass. Consult with Glazing Subcontractor to determine appropriate protective measures.

.3 Do not rely on use of adhesive plastic films to protect installed glass. When plastic sheeting is used, it must be transparent, suspended away from the surface of the glass, and be provided with adequate ventilation holes to prevent heat build-up.

3.9 GLAZING SCHEDULE

.1 Glazed Exteriro Aluminum Storefront Framing and Exterior Aluminum Doors;
- .1 Specified in Section 08 13 16.
- .1 Glazing by the section noted above, in accordance with glazed aluminum curtain wall manufacturer's details.
- .2 Method: Exterior Dry (preformed gasket and gasket).

CLEANING

.1 As work progresses clean all glass, including fittings. Remove all setting and glazing compounds from adjacent surfaces. Remove all finger and hand prints and other soil.

.2 Protect glass from contact with contaminating substances during construction.

.3 Clean and wash glass by methods recommended by glass manufacturers.

.4 All glass shall be cleaned immediately prior to the Consultant’s review for Substantial Performance and again immediately prior to occupancy of the building by the Owner.

.5 Remove all protective materials, glazing materials, and other deposits from finished surfaces.

.6 Remove labels after work is complete.

.7 Do not use vigorous cleaning methods. Avoid scratching glass.

.8 Clean and restore stained or damaged surfaces in accordance with manufacturer's recommendations. Replace glass if cleaning is impossible.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

.1	General Requirements	Division 01
.2	Joint Sealants	Section 07 92 00

1.2 REFERENCE STANDARDS

.1 American National Standards Institute (ANSI)/Ceramic Tile Institute (CTI)

- .1 ANSI A108.1, Specification for the Installation of Ceramic Tile (Includes ANSI A108.1A-C, 108.4-.13, A118.1-.10, ANSI A136.1).
- .2 CTI A118.3, Specification for Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive (included in ANSI A108.1).
- .3 CTI A118.4, Specification for Latex Cement Mortar (included in ANSI A108.1).
- .4 CTI A118.5, Specification for Chemical Resistant Furan Resin Mortars and Grouts for Tile Installation (included in ANSI A108.1).
- .5 CTI A118.6, Specification for Ceramic Tile Grouts (included in ANSI A108.1).

.2 American Society for Testing and Materials International (ASTM)

- .1 ASTM C144, Specification for Aggregate for Masonry Mortar.
- .2 ASTM C207, Specification for Hydrated Lime for Masonry Purposes. ASTM
- .3 C847-06, Specification for Metal Lath.
- .4 ASTM C979, Specification for Pigments for Integrally Coloured Concrete.

.3 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-51.34-M86(R1988) , Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .2 CGSB 71-GP-22M-78(AMEND.), Adhesive, Organic, for Installation of Ceramic Wall Tile.
- .3 CAN/CGSB-75.1-M88, Tile, Ceramic.
- .4 CAN/CGSB-25.20-95, Surface Sealer for Floors.

.4 CSA Group (CSA)

- .1 CSA A123.3-05, Asphalt Saturated Organic Roofing Felt.
- .2 CAN/CSA-A3000-03(R2006), Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.5 South Coast Air Quality Management District (SCAQMD), California State

- .1 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.

.6 Terrazzo Tile and Marble Association of Canada (TTMAC)

- .1 Tile Specification Guide 09 30 00 2006/2007, Tile Installation Manual.
- .2 Tile Maintenance Guide 2000.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Provide product data in accordance with Section 01 33 00 - Submittal Procedures.

.1 Include manufacturer's information on:

.1 Ceramic tile, marked to show each type, size, and shape required.

.2 Chemical resistant mortar and grout (Epoxy and Furan).

.3 Cementitious backer unit.

.4 Dry-set cement mortar and grout.

.5 Divider strip.

.6 Elastomeric membrane and bond coat.

.7 Reinforcing tape.

.8 Levelling compound.

.9 Latex cement mortar and grout.

.10 Commercial cement grout.

.11 Organic adhesive.

.12 Slip resistant tile.

.13 Waterproofing isolation membrane.

.14 Fasteners.

.3 Provide samples in accordance with Section 01 33 00- Submittal Procedures.

.1 Base tile: submit, 300 x 300 mm sample panels of each colour, texture, size, and pattern of tile.

.2 Floor tile: submit, 300 x 300 mm sample panels of each colour, texture, size, and pattern of tile.

.3 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.

.4 Adhere tile samples to 11 mm thick plywood and grout joints to represent project installation.

.4 Closeout Submittals in accordance with Section 01 78 00 – Closeout Submittals.

.1 Submit three (3) copies of TTMAC Hard Surface Maintenance Guide, for inclusion in maintenance manuals.

.2 Provide document listing specific warnings of any maintenance products or practices that could possible damage the finish work.

1.4 QUALITY ASSURANCE

.1 Quality Assurance Submittals:

.1 Manufacturer's Instructions: manufacturer's installation instructions.

.2 Manufacturer's Field Reports: manufacturer's field reports specified.

.3 The work of this section shall be carried out by a company that is a member in good standing of the Terrazzo, Tile and Marble Association of Canada.

.4 This work shall be done under proper supervision by person’s skilled in the methods following the recommendations of the manufacturer of the Products involved and having a minimum of two years proven experience.

.5 The ceramic tile Subcontractor shall provide proof of having successfully completed at least two years proven experience.

.6 Epoxy grout installation shall be carried out only by an installer experienced in the use of this Product with strict conformance to the manufacturer's installation and cleaning recommendations.

.7 The epoxy grout manufacturer/supplier shall visit the site prior to commencement of grouting to review installation and cleaning procedures with the ceramic tile Subcontractor.

.8 Prevent any traffic over completed floors for a period of 72 hours after completion.

.9 Provide protection of finished floors subject to construction traffic.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle materials in accordance with Manufacturer's written instructions.

1.6 AMBIENT CONDITIONS

.1 Maintain air temperature and structural base temperature at ceramic tile installation area above 12 degrees C for 48 hours before, during, and 48 hours after, installation.

.2 Do not install tiles at temperatures less than 12 degrees C or above 38 degrees C.

.3 Do not apply epoxy mortar and grouts at temperatures below 15 degrees C or above 25 degrees C.

1.7 MOCK-UPS

.1 Construct mock-up panels in accordance with Section 01 45 00 – Quality Control.

.2 Construct mock-up panels of finished ceramic tile work, 2.5m by 2.5m in size, of each ceramic tile type.

.3 Construct mock-up panels where directed by the Consultant.

.4 The procedure for Cleaning the grout from the tile shall be carried out in the presence of the Owner's representative, the Consultant, and the Contractor for a minimum of three washes.

.5 Allow 48 hours for inspection of mock-up panels by the consultant before proceeding with work.

.6 When accepted, mock-up panels will demonstrate minimum standard for this work. The approved mock-up panels may remain as part of the finished work.

1.8 MAINTENANCE

.1 Extra Materials:

.1 Provide maintenance materials in accordance with Section 01 78 00- Closeout Submittals.

.2 Provide minimum 2 boxes of each type and colour of tile required for project for maintenance use. Store where directed.

.3 Maintenance material same production run as installed material.

.2 Provide four copies of the TTMAC Maintenance Guide, latest edition, for inclusion in the Maintenance Manual.

.3 Give specific warning of any maintenance practice or material which may damage or disfigure the finish work or alter the coefficient of friction (i.e. slip resistance) of the finished surface.

1.9 WARRANTY

.1 Provide a warranty for ceramic tile work in accordance with the General Conditions, but for a period of three (3) years.

.2 The warranty shall cover the complete installation provided under this section against defective material and workmanship.

PART 2 PRODUCTS

2.1 FLOOR TILE

.1 Porcelain Floor Tile (POR or POR-N): to CAN/CGSB-75.1, Type 4, Class MR 1, square edges, slip resistant surface. A DCOF value of ≥0.42 is the standard for tiles specified for wet areas with minimal footwear spaces expected to be walked upon when wet, as stated in ANSI A137.1-2012, Section 9.6. All curves, and other cuts where indicated on the drawings shall be laser cut by the tile manufacturer and shall be delivered ready for setting. All materials to match corner interior and exterior trims and shapes. Refer to Architectural Finishes Drawings for location of Anti-slip porcelain floor tile (POR).

.1 Acceptable Products for POR/POR-N floor tile:
- .1 Anatolia, Notion Unglazed Porcelain,
  - .1 Size: 30cm x 60cm.
  - .2 Installation: Grid pattern.
  - .3 Colour: Ice.
  - .4 Style: Rectified, Matte.

2.2 BASE TILE

.1 Base: All materials to match porcelain floor tile, interior and exterior corners, trims and shapes indicating field colour or accent bands as indicated on drawings.

.2 At POR-N/POR floor tile provide 100mm high POR-N1 floor base with continuous metal top edge described below under 2.8 Accessories.

2.3 TRIM SHAPES

.1 Conform to applicable requirements of adjoining floor and wall tile.

.2 Use slip resistant trim shapes for horizontal surfaces of showers, and drying area curbs.

.3 Use trim shapes sizes conforming to size of adjoining field wall tile, including existing spaces, unless specified otherwise.

.4 Internal and External Corners: provide trim shapes as follows where indicated.

- .1 Bullnose shapes for external corners including edges.
- .2 Coved shapes for internal corners.
- .3 Special shapes for:
  - .1 Base to floor internal corners to provide integral coved vertical and horizontal joint.

.2 Base to floor external corners to provide bullnose vertical edge with integral coved horizontal joint. Use as stop at bottom of openings having bullnose return to wall.

.3 Wall top edge internal corners to provide integral coved vertical joint with bullnose top edge.

.4 Wall top edge external corners to provide bullnose vertical and horizontal joint edge.

2.4 MORTAR, ADHESIVE MATERIALS AND MIXES

.1 Cement: to CSA-A5, type 10.

.2 Sand: to ASTM C144, passing 16 mesh.

.3 Hydrated lime: to ASTM C207.

.4 Latex additive: formulated for use in cement mortar and thin set bond coat.

.5 Water: potable and free of minerals and chemicals which are detrimental to mortar and grout mixes.

.6 Adhesives: to be supplied by grout supplier.

.1 Maximum VOC limit 65 g/L to SCAQMD Rule 1168.

.7 Mortar Bed for Floors: 1 part Portland cement, 4 parts sand, 1 part water. Adjust water volume depending on water content of sand. Use latex additive in modification of mortar bed. Alternatively use Flextile Ltd., 4:1 Dry Pack Mortar and No.44 Latex Additive. Or Flextile Ltd., 4:1 Dry Pack Mortar and No. 43 Latex Additive.

.8 Levelling coat: 1 part Portland cement, 4 part sand, minimum 1/10 part latex additive, 1 part water including latex additive. Alternatively use Flextile Ltd., No.59 Flex-Flo or No.5900 Flex-Flo Plus.

.9 Measure mortar ingredients by volume.

.10 Dry Set Mortar: mix to manufacturer's instructions.

2.5 BOND COAT

.1 Dry set cement mortar: to ANSI A108.1.

.2 Organic adhesive: to ANSI A136.1 CGSB 71-GP-22M.

.1 Maximum VOC limit 65 g/L to SCAQMD Rule 1168.

.3 Latex Cement mortar: to ANSI A108.1, two-component universal dry-set mortar.

.4 Epoxy bond coat: non-toxic, non-flammable, non-hazardous during storage, mixing, application, and when cured. To produce shock and chemical resistant mortars having the following physical characteristics:

.1 Compressive Strength: 246 kg/cm^2.

.2 Bond Strength: 53 kg/cm^2.

.3 Water Absorption: 4.0% Max.

.4 Ozone Resistance, 200 hours @ 200 ppm: no loss of strength.

.5 Smoke Contribution Factor: 0.

.6 Flame Contribution Factor: 0.

.7 Finished mortar and grout to be resistant to urine, dilute acid, dilute alkali, sugar, brine and food waste products, petroleum distillates, oil and aromatic solvents.

.8 Bond Coat: maximum VOC limit 65 g/L to SCAQMD Rule 1168.

.5 Chemical-Resistant Bond Coat:

.1 Epoxy Resin Type: CTI A118.3.

.2 Furan Resin Type: CTI A118.5.

.3 Bond Coat: maximum VOC limit 65 g/L to SCAQMD Rule 1168.

2.6 GROUT

.1 Colouring Pigments:

.1 Pure mineral pigments, limeproof and nonfading, complying with ASTM C979.

.2 Colouring pigments to be added to grout by manufacturer.

.3 Job coloured grout are not acceptable.

.4 Use in Commercial Cement Grout, Dry-Set Grout, and Latex Cement Grout.

.2 Cement Grout: to ANSI A108.1.

.1 Use one part white cement to one part white sand passing a number 30 screen.

.3 Commercial Cement Grout: to CTI A118.6.

.4 Dry-Set Grout: to CTI A118.6.

.5 Latex Cement Grout: to ANSI A108.1, fast curing, high early strength, polymer-modified, stain resistant, sanded mix for floors, unsanded mix for walls and floors with polished tiles commercial tile grout.

.6 Chemical-Resistant Grout:

.1 Epoxy grout: to ANSI A108.1, having quality, colour and characteristics to match epoxy bond coat. Adhesive and grout by same manufacturer.

.2 Furan grout: to CTI A118.5.

2.7 ACCESSORIES

.1 Reinforcing mesh: 50 x 50 x 1.6 x 1.6 mm galvanized steel wire mesh, welded fabric design, in flat sheets.

.2 Divider strips:

.1 Laminated strips, core 32 x 3 mm black neoprene, outsides (both sides) brass 32 x 1.29 mm complete with anchors, both sides spaced at 150 mm on centre.

.3 Cleavage plane: polyethylene film to CGSB 51-34.

.4 Metal lath: to ASTM C847 galvanized finish, 10 mm rib at 2.17 kg/m^2

.5 Transition Strips: purpose made metal extrusion; anodized aluminum type.

.6 Porcelain Tile to Resilient Flooring: Satin anodized profile with sloped exposed surface, 4mm high leading edge, integrated trapezoid-preforated anchoring leg. Schluter-RENO-U, size to suit tile thickness.

.7 Reducer Strips: purpose made metal extrusion; anodized aluminum type; maximum slope of 1:2.

.8 **Porcelain Wall Base Cap**: Satin anodized aluminum profile with integrated trapezoid-perforated anchoring leg, and complete with prefabricated corners. Schlüter-RONDEC, size to suit tile thickness. Provide the same profile at the leading edge of the continuous 100mm high porcelain tile curb in Entry Lobby 101.

.9 Junction Strips: Schulter Systems products, for junctions with other floor coverings. Finish: Satin finish anodized aluminum. Profiles as follows:

.1 Reno-V: Sloped transition to low flooring.

.2 Schiene: Tile edge at surface of equal height.

.3 Deco: Transition at tile and hard surface of equal height.

.10 Prefabricated Movement Joints: purpose made, having a Shore A Hardness not less than 60 and elasticity of plus or minus 40 percent when used in accordance to TTMAC Detail 301EJ.

.1 Control joints: Schluter Systems “Dilex-AKWS” movement joint, 6mm wide, with aluminum anchors perforated for bonding into mortar and PVC movement material forming joint surface. Colour to be selected by Consultant, to match grout as closely as possible.

.11 Sealant: in accordance with Section 07 92 00- Joint Sealants.

.12 Sealants: maximum VOC limit 250 g/L to SCAQMD Rule 1168.

.13 Floor sealer and protective coating: to tile and grout manufacturers recommendations.

2.8 MIXES

.1 Cement:

.1 Scratch coat: 1 part cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand, 1 part water, and latex additive where required. Adjust water volume depending on water content of sand.

.2 Slurry bond coat: cement and water mixed to creamy paste. Latex additive may be included.

.3 Mortar bed for floors: 1 part cement, 4 parts sand, 1 part water. Adjust water volume depending on water content of sand. Latex additive may be included.

.4 Mortar bed for walls and ceilings: 1 part cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand and 1 part water. Adjust water volume depending on water content of sand. Latex additive may be included.

.5 Levelling coat: 1 part cement, 4 parts sand, minimum 1/10 part latex additive, 1 part water including latex additive.

.6 Bond or setting coat: 1 part cement, 1/3 part hydrated lime, 1 part water.

.7 Measure mortar ingredients by volume.

.2 Dry set mortar: mix to manufacturer's instructions.

.3 Organic adhesive: pre-mixed.

.1 Adhesives: maximum VOC limit 65 g/L to SCAQMD Rule 1168.

.4 Mix bond and levelling coats, and grout to manufacturer's instructions.

.5 Adjust water volumes to suit water content of sand.

2.9 PATCHING AND LEVELLING COMPOUND

.1 Cement base, acrylic polymer compound, manufactured specifically for resurfacing and leveling concrete floors. Products containing gypsum are not acceptable.

.2 Have not less than the following physical properties:

.1 Compressive strength - 25 MPa.

.2 Tensile strength - 7 MPa.

.3 Flexural strength - 7 MPa.

.4 Density - 1.9.

.3 Capable of being applied in layers up to 50 mm thick, being brought to feather edge, and being trowelled to smooth finish.

.4 Ready for use in 48 hours after application.

2.10 CLEANING COMPOUNDS

.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 Materials containing acid or caustic material are not acceptable.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 WORKMANSHIP

.1 Do tile work in accordance with TTMAC Tile Installation Manual 2006/2007, "Ceramic Tile", except where specified otherwise.

.2 Apply tile or backing coats 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 bullnosed.

.9 Use bullnose edged tiles at termination of wall tile panels, except where panel abuts projecting surface or differing plane.

.10 Install divider strips at junction of tile flooring and dissimilar materials.

.11 Allow minimum 24 hours after installation of tiles, before grouting.

.12 Clean installed tile surfaces after installation and grouting cured.

.13 Make control joints at 5.5m maximum in each direction or a length to width ratio of 2.5 to 1. Make joint width same as tile joints. Fill control joints with sealant in accordance with Section 07 92 00- Joint Sealants. Keep building expansion joints free of mortar and grout.

3.3 WALL TILE

.1 Install in accordance with TTMAC detail

3.4 FLOOR AND BASE TILE

.1 Install in accordance with TTMAC detail

3.5 FLOOR SEALER AND PROTECTIVE COATING

.1 Apply in accordance with manufacturer's instructions.

3.6 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.7 EXAMINATION AND PREPARATION

.1 Surfaces shall be clean, dimensionally stable, cured, and free of contaminants such as oil, sealers and curing compounds.

.2 Concrete Substrate Finish: Cure concrete for a minimum of 28 days.
- .1 Thin-set applications: steel trowel and fine broom finish.
- .2 Mortar bed applications: screed finish.
- .3 Mortar bed applications with a cleavage membrane: Steel trowel finish.

.3 Substrate Surface Variation:
- .1 Mortar bed applications: 6mm in 3000mm maximum.
- .2 Thin-set applications: 3mm in 3000mm and 1.5mm in 305mm maximum.
- .3 Vertical surfaces: 3mm in 2400mm.

.4 Examine areas in which the work of this section is to be applied and notify the Consultant of any deficiencies which must be corrected before work can commence.

.5 Do not proceed with the work until improper conditions are corrected.

.6 Protect other work during installation and protect tile work until properly set, grouted and sealed.

.7 Co-ordinate the work of this section related to the work of other sections.

.8 Apply a leveling coat on uneven surfaces, or surfaces which do not guarantee a plumb or level finish to the tile.

3.8 INSTALLATION AND WORKMANSHIP

.1 Apply tile or backing coats to clean and sound surfaces.

.2 Bring every fourth course, vertical and horizontal, to plumb and level continuous lines.

.3 Thoroughly back-up with mortar all cove, cap, nosing, trimmer, and moulded or shaped pieces and secure firmly in place.

.4 Fit tile around corners, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth, even, and free from chipping. Edges resulting from splitting are not acceptable. Rub exposed edges smooth with abrasive stone.

.5 Leave or cut opening to correct sizes to receive accessories, fittings, or other built-in work.

.6 Drill tile for hardware and for pipes where possible. Otherwise, at pipes and fittings, fit tile closely so that escutcheons cover cut edges of tile.

.7 Maximum finished surface tolerance shall be 1:800.

.8 Make joints between tile uniform, plumb, straight, true, even and flush with adjacent tile with a tolerance of 1mm per 3mm of joint width.

.9 Ensure sheet layout is not visible after installation. Align patterns. Align joints of wall tile with floor tile.

.10 Lay out tiles so that fields are centred on areas, and according to the drawings with perimeter and cut tiles a minimum 1/2 size. Maintain height of panels in full courses to nearest indicated dimension.

.11 Keep 2/3 of the depth of grout joints free of setting material.

.12 Sound tiles after setting and replace hollow- sounding units to obtain full bond.

.13 Make internal angles square, external angles rounded.

.14 Use round edged tiles at termination of wall tile panels, except where panel abuts projecting surface or differing plane.

.15 Install divider strips at junction of tile flooring and dissimilar materials.

.16 Allow a minimum of 24 hours after installation of tiles before grouting. Grouting shall be in accordance with manufacturer's directions. Fill joints solidly.

.17 Finished grout shall be uniform in colour, smooth and without voids, pinholes or low spots. Cover setting bed completely.

.18 Protect tiles from grout staining. Test in advance and pre-seal tile if required. Follow grout manufacturer's recommendations for grout and residue removal. Remove excess grout and polish with clean cloths.

.19 Clean installed tile surfaces after installation and grouting has cured. Final cleaning is specified in Section 01 74 00 – Cleaning and Waste Management.

.20 Finished tile work shall be free of tiles which are pitted, chipped, cracked or scratched.

.21 Install expansion joints where indicated. Install specified control joints at 6000mm on centre in each direction unless indicated otherwise. Make joint width same as tile joints. Where indicated, fill control joints with sealant in accordance with Section 07 92 00 - Sealants. Keep building expansion joints free of mortar and grout. Match colour of sealant to colour of grouted joints.

.22 Caulk around piping and fittings extending through tiled surfaces. Tool to a smooth, flush surface, free from air bubbles and contamination. Provide backer rod under sealant.

.23 Protect installed areas from traffic until setting materials have cured for the periods specified in the TTMAC Tile Installation Manual.

.24 Barricade grouted areas to prevent foot traffic for 24 hours after grouting.

.25 Apply floor sealer and protective coating in accordance with the manufacturer's instructions.

.26 Transition Strips:
- .1 Install specified transition strips where ceramic tile flooring meets dissimilar flooring.
- .2 Install transition strips in mortar, fully bonded to floors following the manufacturer's recommendations.
- .3 Install strips under doors at openings.
- .4 Thoroughly back-up with mortar all hollow areas at underside of transition strips.

3.9 CLEANING

.1 Proceed in accordance with Section 01 74 00 - Cleaning and Waste Management.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1	Mechanical Equipment	Division 20, 22
.2	Electrical Equipment	Division 26, 27, 28

1.2 CEILING SYSTEMS

.1 This Specification includes the ceiling assembly systems listed below, noted in schedules and shown on reflected ceiling plans and details, including acoustical ceiling panels, exposed grid suspension system, wire hangers, fasteners, main runners, cross tees and perimeter trim.

.2 Ceiling systems shall be 610mm x 1220mm lay in exposed Tee system, non-rated.

1.3 ALTERNATES

.1 Proposed product substitutions may be submitted no later than five (5) working days prior to the date established for receipt of bids. Acceptability of a proposed substitution is contingent upon the Consultant's review of the proposal for acceptability and approved products will be set forth by the Addenda. If included in a Bid are substitute products that have not been approved by Addenda, the specified products shall be provided without additional compensation.

.2 Submittals that do not provide adequate data for the product evaluation will not be considered. The proposed substitution must meet all requirements of this section, including but not necessarily limited to, the following: single source materials suppliers (if specified; Underwriters' Laboratories Classified Acoustical performance; Panel design, size, composition, color, and finish; Suspension system component profiles and sizes; Compliance with the referenced standards.

1.4 REFERENCE STANDARDS

.1 American Society for Testing and Materials (ASTM):
- .1 ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
- .2 ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
- .3 ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
- .4 ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.

.5 ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
.6 ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
.7 ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
.8 ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
.9 ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Material.
.10 Armstrong Fire Guard Products - ASTM E 580 Installation of Metal Suspension Systems in Areas Requiring Moderate Seismic Restraint.
.11 ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems.
.12 ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum.
.13 ASTM E 1264 Classification for Acoustical Ceiling Products.

.2 International Building Code.

.3 ASHRAE Standard 62.1-2004, Ventilation for Acceptable Indoor Air Quality.

.4 NFPA 70 National Electrical Code.

.5 ASCE 7 American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures.

.6 International Code Council-Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components.

.7 International Code Council-Evaluation Services Report - Seismic Engineer Report:
.1 ESR 1308 - Armstrong Suspension Systems.

.8 International Association of Plumbing and Mechanical Officials - Seismic Engineer Report.
.1 0244 - Armstrong Single Span Suspension System.

.9 LEED - Leadership in Energy and Environmental Design is a set of rating systems for the design, construction, operation, and maintenance of green buildings.

.10 International Well Building Standard.

1.5 DESIGN

.1 Install continuous wall to wall.

.2 Ceiling system is to have a sound absorption NRC of 0.90 or better, articulation class (AC) of 190 or better and a Light Reflectance of 88% or better.

1.6 SHOP DRAWINGS AND SAMPLES

.1 Reflected ceiling plans indicate proposed layout but this shall not relieve Contractor of responsibility for co-ordination of the work and provision of Shop Drawings where field conditions call for variation from proposed layout.

.2 Submit shop drawings accurately locate lighting fixtures, ventilating grilles, exit lights and other ceiling fittings.

.3 Conform to Section 01 33 00 – Shop Drawings, Product Data and Samples.

.4 Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.

.5 Acoustical Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.

.6 If the material supplied by the acoustical subcontractor does not have an Underwriter's Laboratory classification of acoustical performance on every carton, subcontractor shall be required to send material from every production run appearing on the job to an independent or NVLAP approved laboratory for testing, at the architect's or owner's discretion. All products not conforming to manufacturer's current published values must be removed, disposed of and replaced with complying product at the expense of the Contractor performing the work.

.7 Upon award of the Contract submit duplicate 300mm by 300mm sample panels of each acoustical unit proposed for installation in the project. All panels subsequently used on the job shall match the approved sample.

.8 Submit one representative model sample of each suspension system members for approval prior to commencement of installation.

.9 Ceiling system sample shall show basic construction and assembly, treatment at walls, recessed fixtures, splicing, interlocking, finishes and acoustical unit installation.

1.7 DELIVERY AND STORAGE

.1 Transport, handle and store material in manner to prevent warp, twist and damage to tile and board edges and surfaces in accordance with the manufacturer's recommendations.

.2 Any warped and/or damaged boards, tile and trim shall be rejected and be replaced by new, straight, undamaged and acceptable materials at no cost to the Owner.

.3 Store material in warm, dry place away from water and the elements. Protect against undue loading stresses and shock.

.4 All packaged material shall be delivered in original manufacturers' wrappers and containers with labels and seals intact.

.5 Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

.6 Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

.7 Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.8 PROTECTION AND SPECIAL CLEANING

.1 Exercise care in the execution of work under this Section to prevent damage to finished surfaces and adjacent work, and mechanical and electrical installations.

.2 Clean, repair or replace dirty, discoloured or defective units or exposed suspension members to Consultant's satisfaction.

1.9 EXTRA PANELS AND MAINTENANCE

.1 Provide acoustic panels of each type specified for use in maintenance work. Obtain receipt from the Consultant or Owner’s representative on site.

.2 Do not use panels supplied to Owner for maintenance work to make good any damaged or removed tile required by Contract.

.3 Clearly label all boxes and delivery and store the boxes as directed by the Owner.

.4 Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.

.1 Acoustical Ceiling Units: Furnish quality of full-size units equal to 5.0 percent of amount installed.

.2 Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

1.10 ENVIRONMENT AND REGULATORY REQUIREMENTS

.1 Commence installation after building enclosed and dust- generating activities completed.

.2 Permit wet work to dry prior to commencement of installation.

.3 Maintain uniform minimum temperature of 15 deg. C. and humidity of 20% to 40% prior to, during and after installation.

.4 Comply with Ontario Hydro Electrical Inspection Bulletin No. 30-4-3 regarding support of luminaires in suspended ceilings. Submit to the Consultant a certificate confirming that the ceiling support grid provides support for lighting fixtures in accordance with Ontario Hydro requirements.

.5 Deliver finish materials in unopened packaging provided by manufacturer.

.6 Store materials in work area 48 hours prior to installation, in protected dry areas.

1.11 QUALITY ASSURANCE

.1 Installer is to be experienced in performing work of this section and who has specialized in installation of work similar to that required for this project.

.2 Installer is to have a minimum of five (5) years of experience in performing the work described. Provide proof of experience for review to the Consultant.

.3 Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

.4 Fire Performance Characteristics:
- .1 Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
- .2 Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 Classification.
- .3 Fire Resistance: As follows tested per ASTM E119 and listed in the appropriate floor or roof design in the Underwriters Laboratories Fire Resistance Directory.

1.12 WARRANTY

.1 Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to the following:
- .1 Acoustical Panels: Sagging and warping.
- .2 Grid System: Rusting and manufacturer's defects.

.2 Manufacturer’s Warranty Period:
- .1 Acoustical panels: Ten (10) years from date of substantial completion.
- .2 Suspension: Ten (10) years from date of substantial completion.
- .3 Ceiling System: Thirty (30) years from date of substantial completion.

.3 The Warranty stipulated in the General Conditions of the Contract shall also be deemed to include the following definition in reference to Work specified in this Section. The following will be considered defects without being limited thereto:

- .1 Failure of the suspended ceiling to remain water level.
- .2 Lifting or sagging of tile and board between supports.

.3 Staining and discolouration of factory finishes.
.4 Development of corrosion of galvanized ferrous metal.
.5 Development of cracks, splits and other surface deterioration in acoustic panels.
.6 Failure of hanging wire anchorage.

.4 The warranty period, pertaining to installation, shall be two (2) years, commencing on the date of Substantial Performance of the Work.
.5 Warranties shall be issued to the Owner within two (2) Working Days following the date of Substantial Performance of the Work.

PART 2 – PRODUCTS

2.1 MATERIALS

.1 Acoustic Ceiling Panels (ACT/ACT-N), Ceiling Type C1:
- .1 Typical non-fire rated ceilings, to CAN/CGSB-92.1
- .2 Type: Mineral composition acoustical units, sag resistant.
- .3 Pattern: Non-directional fissured.
- .4 Edge type: Square.
- .5 Colour: White.
- .6 Size: 16mm minimum thickness. Provide 610mm x 1220mm. Refer to architectural reflected ceiling plans for location.
- .7 Shape: Flat
- .8 Flame spread rating of 25 or less.
- .9 Smoke developed class of 50 of less.
- .10 Acceptable Products:
  - .1 Armstrong World Industries Canada Ltd., Fine Fissured 1729.
  - .2 CertainTeed Ceilings, Vantage 10, VAN-197.
  - .3 CGC Interiors: Radar ClimaPlus 2410.

.2 Suspension:
- .1 Acceptable Products, contingent on compatibility with specified ceiling tiles:
  - .1 CGC, Suspension system Donn “DX” 24mm wide faced T-bar.
  - .2 Armstrong World Industries Canada Ltd.: Prelude ML Exposed Tee System.
  - .3 CertainTeed Ceilings: Classic Aluminum Capped Hook System.
  - .4 Chicago Metallic Corporation: Series 1200 Suspension System.
- .2 Exposed interlocking tee grid system, formed out of cold rolled zinc-bond steel 0.54mm thick. Provide fire rated grid where fire ratings noted.
- .3 Main Tees: 38mm x 25.4mm double web rectangular bulb top with capping plate in precoat baked-on white paint finish and incorporating holes for hangers and slots for connecting pieces, and capable of supporting 12.5 kg per 1200mm. for continuous spans and 6.5 kg per 1200mm span for single span without exceeding a deflection of 1/360 of the span.
- .4 Standard Cross-Tees: 25.4 x 25.4mm double web, bulb top, capping plate in precoated white baked-on finish, capable of supporting 11.3 kg per 600mm span without exceeding a deflection of 1/360 of span, and with positive interlock with main tees.
- .5 Structural Cross-Tees as main tees, but with crimped ends for lapping bottom flange of main tees and interlocking tack ends to engage slots in main tees.

.6 Accessories:
- .1 Splice plate, clips, screws, etc. as required to complete the installation. All galvanized finish.

.7 Concealed flat spline: 0.71mm flat steel spline.

.8 Edge Trim:
- .1 0.635mm zinc bonded, cold rolled steel mould.
- .2 Trim shall be minimum 22mm x 22mm angles.
- .3 Provide 50mm wide shadowline trim at perimeter of corridor ceilings.

.9 Finish to tees and edge trim: flame resistant white baked enamel satin finish to match panel finish, 2 coats on exposed surfaces, 1 coat elsewhere.

.10 Carrying Channels: 38mm x 19mm cold rolled galv. weighing 1.042 kg per metre.

.11 Tie Wire: 1.6mm galvanized soft annealed steel

.12 Hangers: 2.6mm galvanized steel wire.

.13 Screws: Corrosion resistant, self-tapping Philips truss head, of length and gauge to suit installation.

.14 Ceiling Hanger Pins (for fixing to metal): capacitor discharge ceiling hanger pins, by Continental Studwelding Ltd., or approved equivalent, of type approved by Consultant.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

.1 Employ mechanics skilled in this Trade and install work in strict accordance with the system manufacturer's printed directions to produce a first class, true finish, free from dropping, warpage, soiled or damaged tile.

.2 Make provisions for thermal movement.

.3 Install hanger inserts in a manner approved by Consultant.

.4 Locate hangers directly over Main Tees and as close to intersections as possible. Secure hangers firmly to concrete inserts, steel joists and beams, bracing, etc. Do not install hangers to metal deck, provide separate grid off joists if required.

.5 Erect ceiling grid plumb and square with accurately fitted locked-in joints in true alignment, secure and rigid and with provision for thermal movement. Water level ceiling to tolerance of 1mm in 1m and maximum deviation of 4mm. from mean level.

.6 Frame around recesses fixtures, diffusers, grilles, and the like and provide heavier section hangers and supports as necessary to support same. Provide hanger within 150mm. of each fixture corner.

.7 Consult with Electrical and Mechanical Trades for requirements and provide access to valves and switches.

.8 Ensure that all hangers and carrying members are designed and spaced to support entire ceiling system including recessed lighting fixtures. Note, weight of fixtures is approximately 9-13.5 kg.

.9 Install panels only after all mechanical and electrical equipment, conduits, piping, telephone distribution, etc. are in place.

.10 Co-ordinate ceiling work to accommodate components of other sections, to be built into acoustical ceiling components, such as light fixtures, diffusers, speakers and sprinkler heads.

.11 Neatly cut acoustical units to fit tightly around all building elements that penetrate ceiling.

.12 Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders where possible, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

.13 Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.

.14 Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.2 INSTALLATION OF LAY-IN SUSPENSION SYSTEM

.1 Install suspension system in accordance with ASTM-C636 except where specified otherwise. Install suspension system to manufacturer's instructions and certification organization’s tested design requirements where referenced.

.2 Generally hangers shall be spaced at not more than 1200mm o.c. directly above main runner tees, except at fixtures, where they shall be 600mm o.c. or closer as required to adequately support fixtures. Locate hangers as close as possible to tee junctions. Locate first hanger within 300mm of perimeter wall.

.3 Install main tee runners continuous at 1200mm o.c. with interlocking structural cross-tees each side of fixtures at right angles to main tees. Install standard cross-tees generally at 90 degrees to main tees and as required to achieve pattern shown on reflected ceiling plans. Secure joints by web of tees; snaplock into place forming rigid connections. Main tees shall be as long as possible with butt ends joined by means of splice plates locked into webs.

.4 Frame up around light fixtures, grilles, diffusers, speakers, openings, etc. as required.

.5 Secure edge moldings to walls, bulkheads and other vertical surfaces at perimeter edges of acoustic ceilings. Note special moldings required.

.6 Securely fix hangers to tees by bending ends 90 degrees at the correct height and inserting through holes in top of main tees, then wiring around open side at least 3 turns twisting ends together. Flats shall be bolted to tees. Secure to concrete inserts in similar manner.

.7 Do not erect ceiling suspension system until work above ceiling has been inspected by the Building Inspector.

.8 Do not secure hangers to fluted steel floor or roof deck. Secure hangers to overhead structure using attachment methods as required for particular structure and acceptable to the Consultant. Where structural spacing exceeds ceiling hanger spacing, provide double carrying channels nested and placed perpendicular to and on top of bottom flange of steel beams or on top of the lower chords of the open web steel joists, and secured to each joist with three loops of 1.2mm galvanized soft steel wire.

.9 Where obstructions interfere with the placement of ceiling hangers, provide double carrying channels nested and hung from the structure above on both sides of the obstruction.

.10 Provide isolation hangers at all hangers where indicated as required for specific ceiling assemblies.

.11 Install hangers on main tees spaced at maximum 1200mm centres and within 150mm from ends of main tees and tee splices.

.12 Lay out with border units not less than 50% of standard unit width and according to reflected ceiling plans.

.13 Ensure suspension system is coordinated with location of related components.

.14 Install typical wall moulding to provide correct ceiling height.

.15 Completed suspension system shall support super-imposed loads, such as lighting fixtures, diffusers, grilles, speakers and other ceiling mounted fixtures.

.16 Support at light fixtures and diffusers with additional ceiling suspension hangers within 150mm of each corner and at maximum 600mm around perimeter of fixture. Install an additional hanger immediately above each fastener for ceiling mounted curtain tracks.

.17 Interlock cross member to main runner to provide rigid assembly. Ensure all main tee splices and cross tee end clips are fully engaged.

.18 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.

.19 Finished ceiling system shall be square with adjoining walls and level within 6mm in 3000mm.

3.3 LAY-IN PANEL INSTALLATION

.1 End panels shall not be less than half full size and installation in each area shall be symmetrical, with end tiles and abutting opposite vertical wall surface to be of the same width. Do all necessary cutting and fitting neatly and accurately to suit grid openings and accommodate fixtures, grilles, detectors, speakers and the like located on the ceiling panels.

.2 Lay directionally patterned acoustic panels in one direction, parallel to the longest direction of the grid concerned.

.3 Place panels between tees so that edges bear evenly on flanges.

.4 Confirm with reflected ceiling plans.

.5 Provide fire rated enclosures as required around light fixtures and mechanical equipment in fire rated ceilings, according to applicable ULC Design Criteria.

.6 Where mechanical equipment is located above the ceiling, panels shall be suitably and inconspicuously marked by the use of small colour-coded stickers. Mechanical equipment to be located shall include valves, dampers, heat exchangers, heat pumps, VAV boxes, electrical disconnects, as applicable, and other such equipment not visible from below.

3.4 CLEANING

.1 Upon completion, clean acoustic tile of all finger marks and other defacements.

.2 Remove all accumulated rubbish and excess materials from the site.

.3 Clean acoustic tile and replace any damaged tiles immediately before occupation of building by Owner. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove any ceiling products that cannot be successfully cleaned and or repaired. Replace with attic stock or new product to eliminate evidence of damage.

.4 Replace damaged and broken panels.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1	Mechanical	Division 20, 22
.2	Electrical	Division 26, 27, 28

1.2 SCOPE OF WORK

.1 With exceptions specified above or specifically called for in other Sections of the Specification, all paintwork is included in the scope of this Section of the Specification. Colours will be specified at a later date by the Consultant.

.2 In locations where Drawings do not call for paint or similar finish on walls and/or ceilings, the intent of this Specification is that items, new work and existing surfaces in areas affected by the Work of this project, including miscellaneous metal work, shall be painted.

.3 Work includes moisture testing and surface preparation of substrates as required for acceptance of paint, including cleaning, small crack repair, patching, caulking, and making good surfaces, and specific pre-treatments, sealing, and priming of surfaces.

.4 Check conditions of all existing surfaces to be repainted before commencing new work, including assessing the level of degradation of the surface, the type of coating existing, and the thickness of the existing coating. Perform adhesion tests on all existing coatings to be repainted to ensure that surfaces are sound and well adhered before applying new coatings. It is expected that the Contractor will have visually assessed the existing conditions during the pre-tender site visit, and no contract extras will be considered for addressing conditions which were readily apparent at that time.

.5 Perform interior painting called for in Room Schedule and Door Schedule and noted on drawings. Paint all new walls, ceilings, bulkheads, tectum, and all surfaces which normally receive a paint finish, whether noted on schedules, or not noted. Walls shall be completely painted before installation of tackboards, millwork, etc.

.6 All heating units, recessed convectors, grilles, pipes, access panels, hangers and miscellaneous exposed metal work (other than stainless steel, anodized aluminum and baked enamel) to be painted to match the surfaces on which they occur, unless otherwise directed by Consultant.

.7 For special painted graphics, colour changes, accent stripes, etc. see drawings.

.8 In all renovated areas, paint affected areas as specified.

.9 Paint all exposed structural steel, electrical conduit and boxes and sprinkler lines in finished areas.

Paint pipes, conduit, ducts and related thermal insulation and all prime painted mechanical and electrical equipment and supports located in mechanical and electrical

rooms and in all locations where Drawings call for paint or similar finish on walls and/or ceilings.

.10 Paint all gas piping, inside and out, whether exposed or concealed. Do not paint other pipe, conduit, ducts, insulation and the like where concealed above ceilings or in service shafts.

.11 Make good paint finish on shop coated work where damaged.

.12 Paint visible portions of steel shelf angles, lintels and structural steel.

.13 Interior of ducts and diffusers visible from exterior on room side.

.14 Painting, as referred to herein shall include paint, enamel, stain, varnish and other finishes herein specified and normally applied to the various materials by the painting Subcontractor.

1.3 REFERENCE STANDARDS

.1 Do painting and finishing to CAN/CGSB-85-GP series standards including Appendix A and to material manufacturer's instructions and to The Master Painters Institute (MPI) Architectural Painting Specification Manual and Maintenance Repainting Manual, except where specifically specified otherwise. The most stringent standards shall apply.

.2 All coatings must conform to Regulation SOR/2009-264, Volatile Organic Compound (VOC) Concentration Limits for Architectural Coatings Regulations, and the VOC limits set therein.

.3 All paints and coatings used must conform to Green Seal Standard GS-11 for paints and coatings based on performance requirements and reduced use of hazardous substances and reduced volatile organic compounds:

1.4 QUALIFICATIONS

.1 The Painting Subcontractor must be a member in good standing of the Ontario Painting Contractors' Association.

1.5 INSPECTION

.1 A cash allowance has been included for independent painting inspections. The cost of the painting inspection is to be paid from the Cash Allowance included in the Contract. Refer to Section 01 10 00.

.2 Painting shall not commence until the inspection company has been notified and the Inspector makes the initial site visit.

.3 Supply the Inspector with a schedule of materials intended for use on the job at the commencement of the painting.

.4 The Inspector will issue Inspection Reports during the Project. On completion of the job, the final Inspection Report will be issued.

1.6 WORK ENVIRONMENT

.1 Do not apply paint finish in areas where dust is being generated.

.2 Maintain environmental conditions within limits recommended by manufacturer, for optimum results. Do not apply coatings under environmental conditions outside manufacturer's absolute limits.

.3 Conform to requirements of MPI Architectural Specification Manual including recommendations for surface preparation.

1.7 ACCEPTANCE OF WORK IN PLACE

.1 Submit written confirmation of acceptance of existing conditions, to the Consultant, prior to commencing painting work. Painting may not commence without submission of this confirmation.

.2 Receipt of this confirmation will be considered a prerequisite for certification of payment for this work.

.3 Notify the Consultant, in writing, immediately if any existing condition is encountered that will prevent the attainment of satisfactory results in this work

1.8 SUBMITTALS

.1 Samples:
- .1 Submit triplicate samples consisting of 300mm x 200mm panels of each type of paint finish specified.
- .2 Panels shall be of same material as that on which sample coatings are to be applied in the field where possible.
- .3 Identify each sample as to job, name of paint manufacturer, finish, colour, name and number, sheen and gloss units and name of Contractor.
- .4 Retain one set of approved samples on site until completion of the Work.

.2 Submit manufacturer’s data sheets for each paint product, including:
- .1 Product characteristics
- .2 Surface preparation instructions and recommendations Primer requirements and finish
- .3 specifications
- .4 Storage and handling recommendations
- .5 Application methods

.6 Cautions
.7 VOC data

.3 Submit written confirmation of acceptance of existing conditions, as specified above.

1.9 STORAGE AND HANDLING

.1 Store paint and painter's materials in clean, dry locations approved by the Consultant. Store materials in an area that is within the acceptable temperature range, per manufacturer’s instructions. Protect from freezing.

.2 All paint shall be in unopened containers, labelled with:
.1 manufacturer’s name,
.2 product name, product type,
.3 instructions for surface preparation and product application,
.4 VOC content,
.5 environmental issues,
.6 batch date, and
.7 colour name and number.

.3 Provide C02 fire extinguisher minimum 9 kg capacity in paint storage area.

.4 Dispose of materials in accordance with the requirements of authorities having jurisdiction.

1.10 SIGNS

.1 Provide legible signs throughout the Work reading "WET PAINT" in prominent positions during painting and while paint is drying.

.2 Use 75mm high letters on white card or board.

1.11 TEMPORARY COVERS AND PROTECTION

.1 Protect floors and other surfaces with temporary covers such as dust sheets, polyethelene film or tarpaulins. All to Consultant's approval.

.2 Mask identification plates occurring on equipment, switch boxes, and fire rating labels, etc. which require painting.

.3 Protect, remove and replace hardware, accessories, lighting fixtures, and similar items as required except primed for paint door closers which shall be painted. Light switches and electrical communication outlet plates to be removed and reinstalled on completion of painting.

.4 Keep oily rags, waste and other similar combustible materials in closed metal containers; take every precaution to avoid spontaneous combustion, remove waste and combustible materials daily.

.5 Clean surfaces soiled by spillage of paint, paint spattering and the like. If such cleaning operations damage the surface, repair and replace damaged work at no cost to the Owner.

1.12 RETOUCHING

.1 Do all retouching, etc. to ensure that the building may be handed over to the Owner in perfect condition, free of spatter, finger prints, rust, watermarks, scratches, blemishes of other disfiguration.

.2 After fully decorating and retouching a room or other area, notify Consultant. After inspection and final approval by Consultant post sign 'DECORATING COMPLETE - NO ADMITTANCE WITHOUT PERMISSION'.

1.13 TEST AREAS

.1 In areas to be repainted, test existing coatings for adhesion before applying new coatings, in accordance with the recommended practices in the MPI Repainting Specification Manual. Check for loose paint using a scraper and check for adhesion by cutting through the coatings and performing duct tape tests, or other acceptable means of testing adhesion. Once adequate adhesion is confirmed, apply a test section of the proposed new coating, allow to dry, and perform adhesion tests in area of new coating to confirm compatibility with existing coatings before proceeding with repainting work. Perform tests in all areas and on all surface types to ensure positive repainting results. Advise Consultant of any areas in which existing or new coatings fail adhesion tests. Do not proceed with the work until a recommended course of action is agreed upon by all parties. Commencement of work will signify acceptance of existing conditions.

.2 In areas of new construction, A room or area in the building will be designated by the Consultant as a test area to establish standard of workmanship, texture, gloss and coverage.

.3 Prior to any painting being started, request a meeting on Site between Consultant, Contractor, and Subcontractor and Inspector to review conditions, surfaces, anticipated problems and to clarify quality of workmanship acceptable to Consultant.

.4 Apply finishes to each type of surface within room with correct material, coats, colour, texture and degree of gloss in sample area and have same approved prior to providing Work of this Section.

.5 Retain test area until after completion of Work. Test area to be minimum standard for the Work.

.6 Failure to comply with the above will be cause for Consultant to request all Work previously painted to be repainted.

1.14 MAINTENANCE MATERIALS

.1 Provide one sealed can, one litre capacity, of each product in each colour used in the Work for Owner's use in maintenance Work.

.2 Container to be new fully labelled with manufacturer's name, type of paint, and colour.

1.15 WARRANTY/GUARANTEE

.1 Furnish a warranty, valid for three (3) years from date of Substantial Performance, or from date of completion of Work if work is not complete at date of Substantial Performance, will be required.

.2 Subcontractor shall warrant that the work has been performed in accordance with the standards and requirements of the MPI Architectural Painting Specification Manual, most recent edition.

PART 2 – PRODUCTS

2.1 MATERIALS

.1 Paint and finishing materials - highest grade, first line quality, low VOC products provided by any of the following manufacturers:
- .1 Benjamin Moore & Co.
- .2 Dulux
- .3 The Sherwin-Williams Company

.2 Paints, enamels, fillers, primers, varnishes and stains - ready mixed products of one of the manufacturers listed. Substitutes will not be allowed.

.3 Thinners, cleaners - type and brand recommended by the paint manufacturer, or Inspector.

.4 Only products manufactured by paint manufacturer stated at time of submission of samples will be allowed on Site unless other materials specifically specified herein. No painting to be performed until paint manufacturer identified and acceptance received from the Consultant and Inspector.

.5 Deliver materials to Site in original unbroken containers bearing brand and maker's name. The presence of any unauthorized material or containers for such, on Site shall be of sufficient cause for rejection of ALL paint materials on Site at that time, and all previous painted work repainted with proper material.

2.2 COLOUR SCHEDULE

.1 Consultant will provide detailed colour schedule at a later date. Conform to schedule including patterns, colours, and locations for all finishes.

.2 A minimum of two (2) paint colours may be selected by the Consultant.

.3 Refer to drawing notes for detailed application instructions.

2.3 FINISHING SYSTEMS

.1 Interior Work:

- .1 Drywall:
  - .1 INT 9.2M Institutional Low Odour/ Low VOC, semi-gloss finish
  - .2 1 coat Primer; MPI #149
  - .3 Walls: 2 coats MPI #147
  - .4 Ceilings: 2 coats of one of the following:
    - .1 2 coats Dulux Lifemaster Interior Acrylic Ceiling Flat # 59170 Zero VOC
    - .2 2 coats Benjamin Moore Ultra Spec 500 Flat Finish K363
    - .3 or equal by one of the approved manufacturers.
  - .5 All drywall, whether requiring finish painting or not, must receive prime coat.

- .2 Ferrous Metal:
  - .1 INT 5.1S Institutional Low Odour/ Low VOC, semi-gloss finish
  - .2 1 coat MPI #107
  - .3 2 coats MPI #147

- .3 Shop Primed Ferrous Metal:
  - .1 INT 5.1S Institutional Low Odour/ Low VOC, semi-gloss finish
  - .2 Confirm type of shop primer used with structural steel supplier.
  - .3 Confirm compatibility of all coatings with manufacturers.
  - .4 Touch up prime coat where damaged, with compatible primer, type MPI#107.
  - .5 2 coats interior latex, MPI #147

- .4 Galvanized Metal:
  - .1 Includes all hollow metal doors, frames and screens.
  - .2 INT 5.3N Institutional Low Odour/ Low VOC, semi-gloss finish
  - .3 1 coat galvanized Primer MPI #134
  - .4 2 coats Acrylic Semi-Gloss MPI #147

- .5 Insulation on Pipes & Ducts:
  - .1 INT 6.8F Institutional Low Odour/ Low VOC, semi-gloss finish
  - .2 1 coat Primer MPI #17
  - .3 2 coats Acrylic Semi-Gloss MPI #147

.6 Mechanical Equipment:
- .1 Institutional Low Odour/ Low VOC, semi-gloss finish
- .2 As specified for metal types.

.7 Piping, Conduit & Ductwork (uncoated):
- .1 INT 5.3N Institutional Low Odour/ Low VOC, semi-gloss finish
- .2 1 coat galvanized Primer MPI #134
- .3 2 coats Acrylic Semi-Gloss MPI #147

.8 Surfaces behind grilles, within 30mm of grille:
- .1 INT 5.3N Institutional Low Odour/ Low VOC, flat finish
- .2 1 coat galvanized Primer MPI #134
- .3 2 Coats Acrylic Flat, Black; MPI #143

.9 NOTE: Use heat resistant paint where required.

PART 3 - EXECUTION

3.1 PREPARATION OF SURFACES

.1 Prepare surfaces in accordance with the following standards and to MPI Architectural Specification Manual Chapters 2 and 3; the most stringent requirements shall apply. Preparation of surfaces must be reviewed with painting inspector. Prepared surfaces must be inspected before application of prime coat.

.1 Prepare wood surfaces to CGSB 85-GP-lM. Use CAN/CGSB 1.126 vinyl sealer over knots and resinous areas. Use CGSB 1-GP -103M wood paste filler for nail holes. Tint filler to match.

.2 Touch up damaged spots of shop paint primer on steel with CAN/CGSB 1.40M to CGSB 85-GP-14M.

.3 Prepare galvanized steel and zinc coated surfaces to CGSB 85-GP-16M. This includes wiped coated steel surfaces.

.4 Prepare masonry and concrete surfaces to CGSB 85-GP-31M.

.5 Prepare wallboard surfaces to CGSB 85-GP-33M. Fill minor cracks with plaster patching compound for stained woodwork.

.6 Prepare concrete floors to CGSB 85-GP-32M.

.7 Prepare copper piping and accessories to CGSB 85-GP-20M.

.8 Apply prime coat on wood scheduled for paint finish before installation.

.9 Back prime wood scheduled for transparent finish. Do not prime surfaces scheduled for transparent finish.

.10 Remove all surface contamination such as oil, grease, loose paint, mill scale, dirt, foreign matter, rust, mould, mildew, mortar, efflorescence, and sealers from existing surfaces to assure sound bonding to tightly adhering old paint.

.11 Scape peeling paint off existing masonry surfaces and apply a compatible masonry sealer, approved for use by the paint manufacturer, before applying new coatings.

.12 Glossy surfaces must be clean and dull before repainting. Wash with abrasive cleanser, or, wash thoroughly and dull by sanding.

.13 Spot prime any existing bare areas with an appropriate primer.

.14 Check for compatibility between existing and new coatings by applying a test patch of the recommended coating system, covering at least 2 to 3 square feet. Allow surface to dry one week before testing adhesion per ASTM D3359. If the coating system is incompatible, complete removal is required.

.15 NOTE: ABOVE NOTED SURFACES MAY NOT ALL BE APPLICABLE TO THIS PROJECT.

3.2 APPLICATION

.1 Apply coatings in accordance with manufacturer's printed instructions.

.2 Use suitable, clean equipment in good condition.

.3 Maintain dust-free suitable conditions on the surfaces free from machine, tool or sandpaper marks, insects, grease, or any other condition liable to impair finished work to prevent production or good results.

.4 Apply evenly, uniform in sheen, colour and texture, free from brush or roller marks, well brushed or rolled in and free of crawls, runs, join marks or other defects.

.5 Permit paint to dry between coats. Touch up uneven spots after applying first coat. Tint various coats of multiple coat work in light shades of the final colour selected, to distinguish between coats.

.6 Give Consultant and Inspector due notice and sufficient opportunity (minimum 48 hours) to inspect each coat. Do not proceed with subsequent coat until preceding coat approved. Consultant reserves the right to order complete retreatment if this condition is not observed.

.7 Painting coats are intended to cover surfaces perfectly; if in painter's opinion, formula specified is inadequate to provide a first class finished surface, report to the Consultant

and have formulas rectified before commencing work. Surfaces imperfectly covered shall receive additional coats at no additional cost. Provide additional coat where ever dark colours are used.

.8 Use paint unadulterated. Use same brand of paint for primer, intermediate and finish coats. Factory mix all paints.

.9 Paint finish shall be applied by roller except in the case of wood trim, door frames, base board and similar work of small surface area which shall be painted by brush. Do not use roller for applying finish other than paint.

.10 Spray painting will not be permitted unless specifically approved in writing by the Consultant in each instance. Consultant may withdraw approval at any time and prohibit spray painting for reasons such as carelessness, poor masking or protection measures, drifting paint fog, disturbance to other Trades, or failure to obtain a dense, even, opaque finish. Spray painting shall be full double coat, i.e. at least two passes for each coat. Do not use spray or roller on wood or metal surfaces, brush only unless approved in writing by Consultant.

.11 Paint entire surfaces, including areas where millwork or other items are to be installed.

.12 After first coat, fill nail holes, splits and scratches, using putty coloured to match finish.

.13 Remove rust, oil, grease and loose shop paint from metal work by brushing or with wire brushes and make good shop coat before proceeding with final finish. Feather out edges to make touch up patches inconspicuous.

.14 Clean castings with wire brush before application of first paint coat.

.15 Do not etch galvanized metal. Use zinc rich primer. This includes metal door frames and the like with wiped zinc coating.

.16 Note that primer is required on all hollow metal doors, frames and screens. Three coat system is required. Sand between all coats.

.17 Remove form oil or parting compounds from concrete surfaces. Use Xylol or approved compound.

.18 Paint interior of pipe spaces, ducts, etc. visible through grilles or through linear metal ceilings in black matt finish.

.19 Conform with Consultant's colour schedule and exactly match approved samples.

.20 Mechanical and Electrical Pipes, Ducts and Conduits:

- .1 Commence Work when piping installation is complete in the area concerned.
- .2 Do not paint plated or other prefinished surfaces, unless otherwise noted.
- .3 Paint conduit in same colour as background paint.
- .4 Apply formulae specified even though surface prime painted at shop prior to delivery. Touch up shop priming where damaged.

.5 Use heat resistant epoxy paint on pipes and surfaces where operating surface temperature exceeds 65 degrees C.

.6 Paint exposed pipes and ducts and their supports and related items in colours to suit colour coding included below; confirm with Consultant. Refer to Mechanical Division 15 for further instructions.

3.3 REPAIRS

.1 Cracks occurring in surfaces requiring patching during "Warranty Period" shall be repainted in such a way that the patch is not visible at a distance of 1m.

.2 If patch painting is not acceptable, repaint entire surface.

END OF SECTION