

SECTION NO.        TITLE

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**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 N/A

### **1.02 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Special procedure submittals:
  - .1 Submit schedule of shutdowns or closure of active service or facility, including power and communications services.

### **1.03 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and maintenance data:
  - .1 Include, in the operation and maintenance manual, manufacturer's operating and maintenance instructions and recommended cleaning materials and methods.
    - .1 Submit operating and maintenance instructions for pre-bid or pre-purchased products or equipment.

### **1.04 WORK COVERED BY CONTRACT DOCUMENTS**

- .1 Work of this Contract comprises renovation of the fourth floor of Barrie City Hall, located at 70 Collier Street, Barrie, Ontario, L4M 4T5; and further identified as Barrie City Hall Fourth Floor Renovation.

### **1.05 CONTRACT METHOD**

- .1 Construct work under one stipulated price contract.
- .2 Employ suppliers and Subcontractors assigned by the Owner for:
  - .1 Security camera temporary removal and reinstatement. To be completed by Tyco's approved contractor or using the Owner's vendor, Wallwin Voice & Data Ltd, from the standing agreement established through the Request for Quotation # FIN2025-264Q Supply and Delivery of Surveillance Cameras and Equipment.
- .3 Relations and responsibilities between the Contractor and suppliers or Subcontractors assigned by the Owner are as defined in Conditions of Contract.

### **1.06 WORK BY OTHERS**

- .1 Cooperate with other Contractors carrying out their respective work.
- .2 Coordinate work with other Contractors. If any part of the work of this Contract depends on work of another Contractor for its proper execution or result, promptly report, in writing, defects which may interfere with proper execution of the work to the Consultant.
- .3 Review scopes of work to be executed at the Place of the Work during work of this Contract:
  - .1 Owner provided and installed demountable wall system:

- .1 Owner to provide demountable wall system through furniture vendor contract. Demountable Partition system provided through Owner to be inclusive of all of its accessories, components, installation, etc. Demountable Partition system inclusive of hardware cylinder locks, floor stop, door pulls, and other related door hardware.
- .2 Contractor responsible for glazing decals, integration of power and data, coordination of flooring material joints, and any other related coordination. Owner and Consultant shall provide shop drawings to Contractor during course of Construction for coordination and planning.

#### **1.07 CONTRACTOR USE OF PREMISES**

- .1 Access to the Place of the Work: Limit use to the fourth floor only.
  - .1 Coordinate use of premises with the Owner's representative.
  - .2 Obtain and pay for additional storage or work areas needed for the work.

#### **1.08 OWNER OCCUPANCY**

- .1 Cooperate with Owner's requirements to schedule operations to minimize conflict and facilitate Owner's occupancy.

#### **1.09 PARTIAL OWNER OCCUPANCY**

The Owner will occupy remaining of building during construction.

#### **1.10 PRE-PURCHASED EQUIPMENT**

- .1 Obtain necessary shop drawings from the Owner and coordinate installation. Expedite, receive, unload, install, connect, and test specified equipment. Warrant such work.
- .2 Notify the Owner's Representative in writing a minimum of fourteen (14) calendar days before shop drawings for Owner provided equipment is required for coordination and review.
- .3 Notify the Owner's Representative in writing as part of Project Schedule for date on which materials and equipment are required. Provide written notice reminder fourteen (14) calendar days before installation is scheduled to commence unless equipment is already received.
- .4 Receive equipment free on board (F.O.B.), store, and maintain equipment until installation.
- .5 Owner provided equipment for Contractor installation:
  - .1 Fridge in R4-03 The Hub
  - .2 Dishwasher in R4-03 The Hub
  - .3 Microwaves in R4-03 The Hub
  - .4 Coffee Maker in R4-03 The Hub
- .6 Owner provided and installed equipment for Contractor coordination and accessory installation:
  - .1 Owner provided and installed demountable wall system:

- .1 Owner to provide demountable wall system through furniture vendor contract. Demountable Partition system provided through Owner to be inclusive of all of its accessories, components, installation, etc. Demountable Partition system inclusive of hardware cylinder locks, floor stop, door pulls, and other related door hardware.
- .2 Contractor responsible for glazing decals, integration of power and data, coordination of flooring material joints, and any other related coordination. Owner and Consultant shall provide shop drawings to Contractor during course of Construction for coordination and planning.

#### **1.11 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING**

- .1 Take responsibility for the care, custody, and control of property which is assigned to the Contractor for performance of the work.
- .2 Take responsibility for the premises assigned to the Contractor for performance of the work.
- .3 Make good damage to existing property caused by work of this Contract.

#### **1.12 EXISTING SERVICES**

- .1 Notify the Owner, Consultant, and utility companies of intended service interruptions and obtain required permissions.
- .2 Provide the Owner and Consultant minimum 48 hours' notice when work involves breaking into, or connecting to, existing services. Provide the Owner and Consultant minimum 48 hours' notice for necessary interruption of mechanical or electrical services. Minimize duration of interruptions. Carry out work, at times as directed by governing authorities, with minimum disturbance to pedestrian, vehicular traffic, and Owner's operations.
- .3 Comply with reviewed schedule and provide notice to affected parties. Provide temporary services to maintain critical building services.
- .4 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
- .5 Protect, relocate, or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.

#### **1.13 DOCUMENTS REQUIRED**

- .1 Maintain at project site, one copy of each document:
  - .1 Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Site-specific health and safety plan and other related documents.
  - .5 WHMIS safety data sheets in accordance with Section 01 35 29 - Health, Safety, and Emergency Response Procedures.
  - .6 Reviewed construction progress Schedule.
  - .7 Reviewed shop drawings.

- .8 Manufacturer's instructions.
- .9 List of outstanding shop drawings.
- .10 Change Orders.
- .11 Change Directives.
- .12 Other modifications to the Contract.
- .13 Site inspection and test reports.
- .14 Permits, inspection certificates, and other documents required by authorities having jurisdiction.
- .15 Other specified documents.

## **2 PRODUCTS**

### **2.01 NOT USED**

- .1 Not used.

## **3 EXECUTION**

### **3.01 NOT USED**

- .1 Not used.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 N/A

### **1.02 ACCESS AND EGRESS**

- .1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

### **1.03 USE OF SITE AND FACILITIES**

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Owner and Consultant to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work provide temporary means to maintain security.
- .4 Owner and Consultant will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.
- .5 Elevator Use
  - .1 If an elevator is required, the elevator will be allocated on a first come first served basis to City staff, visitors and the Contractor.
  - .2 The Contractor shall identify work that requires a dedicated elevator and shall schedule the work outside normal business hours. The Contractor shall notify the Owner's representative and Consultant forty-eight (48) hours in advance to book the elevator.
  - .3 Use only elevators existing in building for moving workers and material.
  - .4 The Contractor shall transport and stockpile materials to limit elevator time use.
  - .5 Protect walls of passenger elevators, to approval of Owner and Consultant prior to use. Do not use elevators without protection for transportation of materials and equipment.
  - .6 Accept liability for damage, safety of equipment and overloading of existing equipment.
- .6 Closures: protect work temporarily until permanent enclosures are completed.
- .7 The Contractor shall not store materials for any length of time at the shipping and receiving loading areas or in the corridors outside of the fourth floor. Materials shall be stored only in the area of work.
  - .1 Delivery and staging area (limited) will be identified by City's representative at construction kick-off meeting.



**1.04 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING**

- .1 Execute work with least possible interference or disturbance to building operations, occupants, public, and normal use of premises. Arrange with Owner and Consultant to facilitate execution of work.

**1.05 EXISTING SERVICES**

- .1 Notify, Owner, Consultant, and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Owner and Consultant forty-eight (48) hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.
- .3 Where unforeseen shutdowns are required, a minimum of twenty-four (24) hours of notice is required.
- .4 Provide for personnel, pedestrian, and vehicular traffic.
- .5 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

**1.06 SPECIAL REQUIREMENTS**

- .1 Carry out noise generating Work Monday, Tuesday, Thursday and Friday from 17:00 to 23:00 hours and on Saturdays, Sundays, and statutory holidays.
  - .1 Hours can expand into 23:00 to 7:00 hours with Owner's representative's written approval minimum twenty-four (24) hours in advance.
- .2 No work shall take place during Council meetings (typically Wednesday evenings). Schedule of Council meetings will be provided to the awarded Contractor at kick-off meeting.
- .3 Submit schedule in accordance with Section 01 32 16.16 - Construction Progress Schedule
- .4 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .5 Keep within limits of work and avenues of ingress and egress.
- .6 Deliver materials outside of peak traffic hours unless otherwise approved by Owner.
- .7 Handling of large equipment or heavy materials must be done outside normal business hours in coordination with the Owner's representative. Cooperation by the Contractor is mandatory.
- .8 Complete concrete floor X-ray scanning only during weekends.
  - .1 Owner's representative, Consultant, and Contractor retained structural engineer shall review findings prior to completing work.
  - .2 Contractor retained structural engineer shall provide stamped drawing and/or letter based on findings of scan for acceptance and records prior to completing coring work.

**1.07 BUILDING SMOKING ENVIRONMENT**

- .1 Comply with smoking restrictions. Smoking is not permitted.

**2 PRODUCTS**

**2.01 NOT USED**

- .1 Not Used.

**3 EXECUTION**

**3.01 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 N/A

### **1.02 ADMINISTRATIVE REQUIREMENTS**

- .1 If information in this Section conflicts with requirements outlined in City issued Contract, Contract Documents, Supplementary Conditions, or other Appendix information, the City issued requirements will take precedence over those listed in this Section.
- .2 Scheduling:
  - .1 Prepare a schedule, jointly with the Departmental Representative and Consultant, to show when allowance work is required to be authorized to prevent project schedule delays.
  - .2 Incorporate this schedule into the construction project schedule in accordance with Section 01 32 16.16 - Construction Progress Schedule.

### **1.03 CASH ALLOWANCES**

- .1 Include specified cash allowances in the Contract Amount
- .2 Cash allowances, cover net Contractor costs for services, products, Construction Equipment, freight, handling, unloading, storage, installation and other authorized expenses incurred in performing the work.
- .3 The Contract Amount, not cash allowances, includes the Contractor's overhead and profit in connection with such cash allowance.
- .4 The Contract Amount will be adjusted, by Change Order, to provide for excess or deficit to each cash allowance.
- .5 The Contractor will be compensated for costs incurred and substantiated in excess of appropriate cash allowance, plus allowance for overhead and profit, as set out in the Contract Documents.
- .6 Include cash allowance work progress in applications for progress payment.
- .7 Cash allowance amounts include:
  - .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 overhead and profit related to the cash allowance.
- .8 Include Contractor's overhead and profit in the Contract Amount; these costs are excluded from cash allowances.
- .9 Cash Allowance Schedule:
  - .1 Allowance 1: Fire stopping repairs to existing conditions
    - .1 Include \$8,000.00, in the Contract Amount, to pay for non-quantifiable amounts of fire-stopping required to repair existing conditions.

- .2 Allowance 2: Abatement & Remediation
  - .1 Include \$10,000.00 in the Contract Amount, to complete abatement, remediation or other repairs or removals related to hazardous materials.
- .3 Allowance 3: Unknown Electrical Requirements for Owner Coordinated Systems
  - .1 Include \$10,000.00 in the Contract Amount, to provide and install any electrical items as may become requirements for Owner coordinated system, as may be requested by Owner's representative and Consultant during course of Construction.

## **2 PRODUCTS**

### **2.01 NOT USED**

- .1 Not Used.

## **3 EXECUTION**

### **3.01 NOT USED**

- .1 Not Used.

**END OF SECTION**

**1 GENERAL**

**1.01 RELATED REQUIREMENTS**

- .1 N/A

**1.02 REFERENCE STANDARDS**

**1.03 N/A REQUIREMENTS**

- .1 Specification Sections stipulate pertinent requirements for products and methods to achieve Work stipulated under each Alternative / Provisional Price.
- .2 Co-ordinate affected related Work and modify surrounding Work to integrate Work under each Alternative, if selected to move forward by Owner.

**1.04 AWARD/SELECTION OF ALTERNATIVES**

- .1 Refer to ITT documents for process of award / equivalency process.

**1.05 SCHEDULE OF ALTERNATIVES / PROVISIONAL PRICES**

- .1 Alternative A: Ceiling Gypsum Board Perimeter
  - .1 Price to include credit for ACT ceiling system not being installed and cost for gypsum board ceiling system being installed. Refer to Drawings and Section 09 21 16 – Gypsum Board Assemblies for additional information. Refer to Section 09 51 13 – Acoustical Panel Ceilings for reveal trim to be provided between gypsum board ceiling system and ACT ceiling system.
- .2 Provisional Price B: Demountable Partitions (DW-1 by Contractor)
  - .1 Price to include cost for all Demountable Partition systems, inclusive of all of its accessories, components, installation, etc. in accordance with Section 10 22 19 – Demountable Partitions and Drawings. Demountable Partition system inclusive of hardware cylinder locks, floor stop, door pulls, and other related door hardware. Demountable wall system to be based upon DW-1 system outlined in specification Section 10 22 19. Price to include credit for not coordinating Owner-supplied and installed demountable walls with site conditions and interconnected Contractor work.
- .3 Provisional Price C: Millwork Booth Benches
  - .1 Price to include cost for custom millwork booth benches. Refer to Drawings for additional information.
- .4 Provisional Price D: Millwork Linear Bench
  - .1 Price to include cost for custom linear millwork bench. Refer to Drawings for additional information.
- .5 Provisional Price E: Window Roller Blinds

- .1 Price to be unit cost for Window Roller Blind, in accordance with Section 12 24 13 – Roller Window Shades. Refer to Drawings for maximum quantity that may be requested (one per exterior wall window). Unit price shall be applicable to unit quantities within the range of one (1) to maximum quantity of exterior windows in Drawings.
- .6 Alternative F: ACT Ceiling Type
  - .1 Price to include credit for base ACT ceiling type not being included, and include cost for alternative specified system. Refer to Section 09 51 13 – Acoustical Panel Ceilings. Cost provided is to be the dollar value to upgrade from the base bid type to the provisional price type.
- .7 Alternative G: Demountable Partitions (DW-2 by Contractor)
  - .1 Price to include cost for all Demountable Partition systems, inclusive of all of its accessories, components, installation, etc. in accordance with Section 10 22 19 – Demountable Partitions and Drawings. Demountable Partition system inclusive of hardware cylinder locks, floor stop, door pulls, and other related door hardware. Demountable wall system to be based upon DW-2 system outlined in specification Section 10 22 19. Price to include credit for not coordinating Owner-supplied and installed demountable walls with site conditions and interconnected Contractor work.

## **2 PRODUCTS**

### **2.01 NOT USED**

- .1 Not Used.

## **3 EXECUTION**

### **3.01 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **1 GENERAL**

### **1.01 SECTION INCLUDES**

- .1 N/A

### **1.02 RELATED SECTIONS**

- .1 Section 01 21 00 - Allowances.
- .2 Section 01 23 00 - Alternatives.

### **1.03 SUBSTITUTIONS**

1. No considerations, unless outlined below, will be accepted after Contract Award.
2. Substitutions may be considered when a Product becomes unavailable through no fault of the Contractor.
  1. Inadequate planning or delay in ordering does not constitute a Product becoming unavailable.
3. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
4. A request constitutes a representation that the Contractor:
  1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.
  2. Will provide the same warranty for the Substitution as for the specified Product.
  3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
  4. Waives claims for additional costs or time extension which may subsequently become apparent.
  5. Will track all related changes of the substitution, if accepted, via as-built drawings for both the substitution and any other Work which may be affected by the substitution.
  6. Will coordinate any changes in documents provided to the Authorities Having Jurisdiction (AHJ) as may be reasonably requested by the Consultant and AHJ for permit and record purposes.
5. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request.
6. Substitution Submittal Procedure:
  1. Submit one (1) digital copy of request for Substitution for consideration. Limit each request to one (1) proposed Substitution.
  2. Submit shop drawings, product data, and certified test results attesting to the proposed Product equivalence. Burden of proof is on proposer.
  3. The Owner's representative and/or Consultant will notify the Contractor in writing if the requested substitution submitted is accepted or rejected.

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FOURTH FLOOR RENOVATION

SECTION 01 25 00  
Substitution Procedures  
PAGE 2 OF 2

END OF SECTION



## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 N/A

### **1.02 ADMINISTRATIVE**

- .1 Schedule and administer project meetings throughout the progress of the work at the call of Owner and Consultant.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting four (4) days in advance of meeting date to Owner and Consultant.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within two (2) days after meetings and transmit to meeting participants and, affected parties not in attendance, Owner, and Consultant.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

### **1.03 PRECONSTRUCTION MEETING**

- .1 Promptly after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Senior representatives of Owner, Consultant, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum five (5) days before meeting.
- .4 Agenda to include:
  - .1 Appointment of official representative of participants in the Work.
  - .2 Schedule of Work: in accordance with Section 01 32 16.16 - Construction Progress Schedule.
  - .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
  - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
  - .5 Delivery schedule of specified equipment in accordance with the specifications.
  - .6 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

- .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .8 Owner provided products.
- .9 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .10 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
- .11 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .12 Monthly progress claims, administrative procedures, photographs, hold backs.
- .13 Selection of progress meeting days and times.
- .14 Appointment of inspection and testing agencies or firms.

#### **1.04 PROGRESS MEETINGS**

- .1 During course of Work schedule progress meetings weekly.
  - .1 Coordinate with Owner and Consultant at Preconstruction Meeting to determine balance between in-person versus virtual progress meeting needs and frequencies.
- .2 Contractor, major Subcontractors involved in Work, Owner, and Consultant are to be in attendance.
- .3 Notify parties minimum five (5) days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within two (2) days after meeting.
- .5 Agenda to include the following:
  - .1 Review, approval of minutes of previous meeting.
  - .2 Review of Work progress since previous meeting.
  - .3 Field observations, problems, conflicts.
  - .4 Problems which impede construction schedule.
  - .5 Review of off-site fabrication delivery schedules.
  - .6 Corrective measures and procedures to regain projected schedule.
  - .7 Revision to construction schedule.
  - .8 Progress schedule, during succeeding work period.
  - .9 Review submittal schedules: expedite as required.
  - .10 Maintenance of quality standards.
  - .11 Review proposed changes for affect on construction schedule and on completion date.
  - .12 Other business.

**2 PRODUCTS**

**2.01 NOT USED**

.1 Not Used.

**3 EXECUTION**

**3.01 NOT USED**

.1 Not Used.

**END OF SECTION**

## **1 GENERAL**

### **1.01 SECTION INCLUDES**

- .1 Schedules, form, content, submission
- .2 Construction Progress Scheduling
- .3 Progress photographs
- .4 Submittal schedule

### **1.02 RELATED REQUIREMENTS**

- .1 Section 01 32 16 – Construction Progress Schedule Critical Path Method (CPM)
- .2 Section 01 33 00 – Submittal Procedures

### **1.03 SCHEDULES**

- .1 Submit to Consultant schedules listed for review promptly at start of project and updated as requested by Consultant and Owner throughout course of project, at minimum every month with payment request.
  - .1 Submittal Schedule for Shop Drawings and Product Data.
  - .2 Submittal Schedule for Samples.
  - .3 Submittal Schedule for timeliness of Owner-furnished products.
  - .4 Construction Progress Schedule.
  - .5 Product Delivery Schedule.
  - .6 Cash Allowance Schedule.
  - .7 Shutdown or closure activity Schedule.
  - .8 After hours activity Schedule.
  - .9 Access to areas outside of fourth floor Schedule.
- .2 Schedule Format:
  - .1 Prepare schedule in form of a horizontal bar chart or table.
  - .2 Provide a separate bar or table line for each major item of work, subcontractor and/or operation.
  - .3 Split horizontally for projected and actual performance.
  - .4 Provide horizontal time scale identifying first Working Day of each week.
  - .5 Format listings in chronological order of start of each item of work.
  - .6 Identify listings by specification subject and system descriptions.
- .3 Schedule Submission:
  - .1 Submit initial format of schedules promptly after award of Contract.
  - .2 Submit schedules in electronic format, forward through e-mail as /pdf files.

- .3 Consultant and Owner will review schedule and return reviewed copy promptly after receipt.
- .4 Resubmit finalized schedules within seven (7) days after return of review copy.
- .5 Submit revised Schedules with each application for payment, inclusive of Construction Progress Schedule in Section 01 32 16.
- .6 Distribute copies of revised schedule to Work Site, subcontractors, and other concerned parties.
  - .1 Instruct recipients to report to Contractor within five (5) days any problems anticipated by timetable shown in schedule.

#### **1.04 CONSTRUCTION PROGRESS SCHEDULING**

- .1 Comply with Section 01 32 16 – Construction Progress Schedule Critical Path Method (CPM) requirements to track construction progress.

#### **1.05 PROGRESS PHOTOGRAPHS**

- .1 Submit electronic colour digital photography in .jpg format. Ensure resolution is clear and does not degrade when sent electronically.
- .2 Number of Viewpoints: Minimum four (4), more as necessary to capture overall site progress. Locations of viewpoints determined by Contractor unless specifically requested by Consultant or Owner.
- .3 Frequency: Weekly, either Friday end of working day or Monday mornings.
- .4 Contractor shall provide photograph documentation at other times as reasonably requested by the Consultant, Owner and at major stages of project progress completions.
- .5 Identification: Name and number of project and date of exposure indicated.

#### **1.06 SUBMITTAL SCHEDULE**

- .1 Include schedule for submitting Shop Drawings, product data, samples.
- .2 Indicate dates for submitting review time, resubmission time, and last date for meeting fabrication schedule.
- .3 Include dates when submittals and/or delivery will be required for Owner-furnished products.
- .4 Include dates when reviewed submittals will be required from Consultants.
- .5 Coordinate timelines with requirements in Section 01 33 00 – Submittal Procedures.

### **2 PRODUCTS**

#### **2.01 NOT USED**

- .1 Not Used.

**3 EXECUTION**

**3.01 NOT USED**

.1 Not Used.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 N/A

### **1.02 DEFINITIONS**

- .1 Activity: Distinct, scheduled portion of work performed during course of a project.
- .2 Activity Duration: time in calendar units between start and finish of a scheduled activity. See also Duration.
- .3 Assumption: factor in planning process that is considered true, real, or certain without proof or demonstration.
- .4 Bar Chart (Gantt Chart): graphic display of schedule-related information.
  - .1 In typical bar chart, schedule activities or work breakdown structure components are listed down left side of chart, dates are shown across the top, and activity durations are shown as date-placed horizontal bars.
- .5 Baseline: approved version of a work product that can be changed only through formal change control procedures and is used as a basis for comparison.
- .6 Budget: approved estimate for a project or work breakdown structure component or schedule activity.
- .7 Cash Flow: projection of progress payment requests based on cash loaded construction schedule.
- .8 Change Control: process whereby modifications to documents, deliverables, or baselines associated with a project are identified, documented, approved, or rejected.
- .9 Completion Milestones: they are firstly Interim Certificate and secondly Final Certificate.
- .10 Constraint: scheduled limiting factor that effects execution of a project, program, portfolio, or process.
- .11 Contract: mutually binding agreement that obligates a seller to provide a specified product or service or result and obligates a buyer to pay for it.
- .12 Control: comparing actual performance with planned performance, analyzing variance, assessing trends, to effect process improvements, evaluating possible alternatives, and recommending appropriate corrective action as needed.
- .13 Corrective Action: intentional activity that realigns performance of project work with project management plan.
- .14 Critical Path: sequence of activities that represents longest path through a project, which determines shortest possible duration.
- .15 Critical Path Activity: activity on critical path in a project schedule.
- .16 Critical Path Method (CPM): method used to estimate minimum project duration and determine amount of scheduling flexibility on logical network of paths within schedule model.
- .17 Data Date: point in time when the status of the project is recorded.

- .18 Decomposition: technique used for dividing and subdividing project scope and project deliverables into smaller, more manageable parts.
- .19 Deliverable: unique and verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase, or project.
- .20 Duration: total number of work periods (not including holidays or other non-working periods) required to complete a schedule activity or work breakdown structure component.
  - .1 Usually expressed as workdays or work weeks.
- .21 Early Finish Date (EF): in Critical Path Method, earliest possible point in time when uncompleted portions of schedule activity can finish based on schedule network logic, data date, and schedule constraints.
  - .1 Early finish dates can change as Project progresses and changes are made to Project plan.
- .22 Early Start Date (ES): in Critical Path Method, earliest possible point in time when uncompleted portions of a schedule activity can start based on schedule network logic, data date, and schedule constraints.
  - .1 Early start dates can change as Project progresses and changes are made to Project Plan.
- .23 Execute: directing, managing, performing, and accomplishing project work; providing deliverables, and providing work performance information.
- .24 Finish Date: point in time associated with a schedule activity's completion.
  - .1 Usually qualified by one of following: actual, planned, estimated, scheduled, early, late, baseline, target, or current.
- .25 Float: (also known as slack) amount of time a schedule activity can be delayed without delaying early start date of a successor or violating a schedule constraint.
  - .1 This resource is available to Contractor.
- .26 Forecast: estimate or prediction of conditions and events in project future based on information and knowledge available at time of forecast.
  - .1 Information is based on projects past performance and expected future performance, and includes information that could impact project in future, a such as estimate at completion and estimate to complete.
- .27 Gantt Chart: see Bar Chart.
- .28 Impact Analysis: schedule analysis technique that adds a modeled delay to an accepted construction schedule to determined possible outcome of that delay on project completion.
- .29 Imposed Date: a fixed date imposed on a schedule activity or schedule milestone, usually in form of a "start no earlier than" and "finish no later than" date.
- .30 Lag: amount of time whereby a successor activity is required to be delayed with respect to a predecessor activity.
- .31 Late Finish Date (LF): in critical path method, latest possible point in time when uncompleted portions of a schedule activity can finish based on schedule network logic, project completion date, and schedule constraints.



- .32 Late Start Date (LS): in critical path method, latest possible point in time when uncompleted portions of a schedule activity can start based on schedule network logic, project completion date, and schedule constraints.
- .33 Lead: amount of time whereby a successor activity can be advanced with respect to a predecessor activity.
- .34 Logic Diagram: see Project network diagram.
- .35 Logical Relationship: dependency between two activities or between an activity and a milestone.
- .36 Master Schedule: summary-level schedule that identifies major deliverable; work breakdowns structure components, and key schedule milestones.
- .37 Milestone: significant point or event in a project, program, or portfolio.
- .38 Monitor: collect project performance data with respect to a plan, procedure performance measures, and report and disseminate performance.
- .39 Network: see Project Schedule Network Diagram.
- .40 Non-Critical Activities: activities which when delayed, do not affect specified Contract duration.
- .41 Project Management: application of knowledge, skills, tools, and techniques, to project activities to meet project requirements.
- .42 Project Management Plan: approved document that describes how project will be executed, monitored, and controlled.
  - .1 Primary uses of Project management plan are to document planning assumptions and decisions, facilitate communication among stakeholders, and document approved scope, cost, and schedule baselines.
  - .2 Project management plan may be summary or detailed.
- .43 Project Management Planning: development and maintenance of Project Management Plan.
- .44 Project Management Planning, Monitoring and Control System: overall system operated to enable monitoring of Project Work in relation to established milestones.
- .45 Project Schedule: planned dates for performing activities and planned dates for meeting milestones.
- .46 Project Schedule Network Diagram: graphical representation of logical relationships among project schedule activities.
  - .1 Always drawn from left to right to reflect Project chronology.
- .47 Project Scope: work performed to deliver a product, service, or result with specified features and functions.
- .48 Quantified days duration: working days based on five (5) day work week, discounting statutory holidays.
- .49 Risk: uncertain event or condition that, if it occurs, has positive or negative effect on one or more project objectives.
- .50 Schedule: see Project Schedule.

- .51 Schedule Data: collection of information for describing and controlling schedule.
- .52 Scope: see Project Scope.
- .53 Start Date: point in time associated with activity's start, usually qualified by one of following: actual, planned, estimated, scheduled, early, late, target, baseline, or current.
- .54 Work Breakdown Structure (WBS): hierarchical decomposition of total scope of work to be carried out by project team to accomplish project objectives and create the required deliverables.

### 1.03 REFERENCE STANDARDS

- .1 Project Management Institute (PMI Standards)
  - .1 A Guide to the Project Management Body of Knowledge (PMBOK Guide) -Fifth Edition.
  - .2 Practice Standard for Scheduling -2011.

### 1.04 ADMINISTRATIVE REQUIREMENTS

- .1 Project Meeting:
  - .1 Meet with Owner's representative and Consultant within five (5) working days of Award of Contract date, to establish Work requirements and approach to project construction operations.
  - .2 Participate in regular project progress meetings with Owner's representative and Consultant specifically intended to discuss update of detailed schedule and contract changes.
- .2 Scheduling:
  - .1 Ensure that planning process is iterative and results in generally top-down processing with more detail being developed as planning progresses, and decisions concerning options and alternatives are made.
  - .2 Ensure project schedule efficiencies through monitoring of project in detail to ensure integrity of Critical Path, by comparing actual completions of individual activities with their scheduled completions, and review progress of activities that has started but are not yet completed.
  - .3 Monitor sufficiently often so that causes of delays can immediately be identified and mitigated.
- .3 Project monitoring and reporting:
  - .1 Keep team aware of changes to schedule, and potential consequences as project progresses.
  - .2 Use narrative reports to provide advice on seriousness of challenges and measures to overcome them.
  - .3 Begin narrative reporting with statement on general status of project followed by summarization of delays, potential problems, corrective measures and project status criticality.

- .4 Critical Path Method (CPM) Requirements:
  - .1 Ensure Master Plan and Detail Schedule are practical and remain within specified contract duration.
  - .2 Revise Master Schedule and Detail Schedule deemed impractical by Owner's representative and Consultant and resubmit for approval.
  - .3 Change to Contract Duration:
    - .1 Acceptance of Master Schedule and Detail Schedule showing scheduled Contract duration shorter than specified Contract duration does not constitute change to Contract.
    - .2 Duration of Contract may only be changed through bilateral written and signed Agreement by Contractor, Owner's representative and Consultant.
  - .4 Consider Master Schedule and Detail Schedule deemed practical by Owner's representative and Consultant, showing Work completed in less than specified Contract duration, to have float.
  - .5 First Milestone on Master Schedule and Detail Schedule will identify start Milestone with an Early Start, "ES", constraint date equal to Award of Contract date.
  - .6 Calculate dates for completion of milestones from Plan and Schedule using specified time periods for Contract.
  - .7 Substantial Completion with Late Finish, "LF", constraint equal to calculated date.
  - .8 Delays to non-critical activities with float may not be basis for time extension.
  - .9 Do not use float suppression techniques such as software constraints, preferential sequencing, special lead/lag logic restraints, extended activity times or imposed dates other than required by Contract.
  - .10 Allow for adverse weather conditions normally anticipated and show in Master Plan and Detail Schedule.
    - .1 Specified Contract duration has been predicated assuming normal amount of adverse weather conditions.
  - .11 Provide necessary crews and manpower to meet schedule requirements for performing Work within specified Contract duration.
    - .1 Simultaneous use of multiple crews on multiple fronts on multiple critical paths may be required.
  - .12 Arrange participation on and off site of subcontractors and suppliers, as required by Owner's representative and Consultant, for purpose of network planning, scheduling, updating and progress monitoring.
    - .1 Approvals by Owner's representative and Consultant of original networks and revisions do not relieve Contractor from duties and responsibilities required by Contract.
  - .13 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, and Substantial Completion as defined times of completion are of essence of this contract.

#### 1.05 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Owner's representative and Consultant Project Control System in digital pdf form for planning, scheduling, monitoring and reporting of project progress.
  - .1 Failure to comply with each required submission, may result in progress payment being withheld until acceptable version is received.
- .3 Include costs for execution, preparation and reproduction of schedule submittals in bid documents.
- .4 Submit letter ensuring that schedule has been prepared in co-ordination with major sub-contractors.
- .5 Refer to article "PROGRESS MONITORING AND REPORTING" of this specification Section for frequency of Project control system submittals.
- .6 Submit impact analysis of schedule for changes that result in extension of contract duration.
  - .1 Include draft schedule update and report as outlined in article "PROGRESS MONITORING AND REPORTING".
- .7 Submit Project planning, monitoring and control system data as part of initial schedule submission and monthly status reporting in following form.
  - .1 Digital files shared by folder sharing or email in .pdf file version, containing schedule and list of most recent Change Orders impacting contract duration, labelled with data date, specific update, and person responsible for update.
  - .2 Master Schedule Bar Chart.
  - .3 Construction Detail Schedule Bar Chart.
  - .4 Listing of project activities including milestones and logical connectors, networks (sub-networks) from Project start to end. Sort activities by activity identification number and accompany with descriptions. List early and late start and finish dates together with durations, codes and float.
  - .5 Criticality report listing activities and milestones with negative, zero and up to five (5) days total float used as first sort for ready identification of critical and near critical paths through entire project. List early and late starts and finishes dates, together with durations, codes and float for critical activities.
  - .6 Progress report in early start sequence, listing for each trade, activities due to start, underway, or finished within one (1) month from monthly update date. List activity identification number, description and duration. Provide columns for entry of actual start and finish dates, duration remaining and remarks concerning action required.

#### 1.06 QUALITY ASSURANCE

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

#### 1.07 WORK BREAKDOWN STRUCTURE (WBS)

- .1 Prepare construction Work Breakdown Structure (WBS) within ten (10) working days of Award of Contract date.
  - .1 Develop WBS through at least four levels: project, stage, element, and work package.

#### 1.08 MASTER SCHEDULE

- .1 Structure and base CPM construction networks system on WBS coding in order to ensure consistency throughout Project.
- .2 Prepare comprehensive construction Master Schedule (CPM logic diagram) within ten (10) working days of finalizing Agreement.
  - .1 Master Schedule will be used as baseline.
    - .1 Revise baseline as conditions dictate, as approved by Owner's representative and Consultant, and as required by Owner's representative and Consultant for any reason.
    - .2 Owner's representative and Consultant, as Project progresses, will review and return revised baseline within five (5) work days.
- .3 Reconcile revisions to Master Schedule with previous baseline to provide continuous audit trail.
- .4 Initial and subsequent Master Schedule will include:
  - .1 Bar chart identifying coding, activity durations, early/late and start/finish dates, total float, completion as percentile, and current status.
  - .2 Network diagram showing coding, activity sequencing (logic), total float, early/late dates, current status and durations.

#### 1.09 DETAIL SCHEDULE

- .1 Provide detailed project schedule (CPM logic diagram) within ten (10) working days of Award of Contract date showing activity sequencing, interdependencies and duration estimates. Include listed activities as follows:
  - .1 Shop drawings.
  - .2 Samples.
  - .3 Approvals.
  - .4 Procurement.
  - .5 Construction.
  - .6 Installation.
  - .7 Testing.
  - .8 Commissioning and acceptance.
  - .9 Deficiency Correction.

- .2 Detail CPM schedule to cover in detail minimum period of six (6) months beginning from Award of Contract date with duration of each activity listed in approximate days.
  - .1 Show remaining activities for CPM construction network system up to Final Certificate and develop complete detail as project progresses.
  - .2 Detail activities completely and comprehensively throughout duration of project.
- .3 Relate Detail Schedule activities to basic activities and milestones developed and approved in Master Schedule.
- .4 Clearly show sequence and interdependence of construction activities and indicate:
  - .1 Start and completion of all items of Work, their major components, and interim milestone completion dates.
  - .2 Activities for procurement, delivery, installation and completion of each major piece of equipment, materials and other supplies, including:
    - .1 Time for submittals, resubmittals and review.
    - .2 Time for fabrication and delivery of manufactured products for Work.
    - .3 Interdependence of procurement and construction activities.
  - .3 Include sufficient detail to assure adequate planning and execution of Work.
- .5 Provide level of detail for project activities such that sequence and interdependency of Contract tasks are demonstrated and allow co-ordination and control of project activities. Show continuous flow from left to right.
- .6 Ensure activities with no float are calculated and clearly indicated on logical CPM construction network system as being, whenever possible, continuous series of activities throughout length of Project to form "Critical Path". Increased number of critical activities is seen as indication of increased risk.
- .7 Insert Change Orders in appropriate and logical location of Detail Schedule. After analysis, clearly state and report to Owner's representative and Consultant for review effects created by insertion of new Change Order.

#### **1.10 REVIEW OF CONSTRUCTION DETAIL SCHEDULE**

- .1 Allow minimum five (5) work days for review by Owner's representative and Consultant of proposed construction Detail Schedule unless otherwise specified.
- .2 Upon receipt of reviewed Detail Schedule make necessary revisions and resubmit to Owner's representative and Consultant for review within maximum five (5) work days unless otherwise specified.
- .3 Promptly provide additional information to validate practicality of Detail Schedule as required by Owner's representative or Consultant.
- .4 Submittal of Detail Schedule indicates that it meets Contract requirements and will be executed generally in sequence.

#### **1.11 COMPLIANCE WITH DETAIL SCHEDULE**

- .1 Comply with reviewed Detail Schedule.

- .2 Proceed with significant changes and deviations from scheduled sequence of activities that cause delay, only after written receipt of approval by Owner's representative and Consultant.
- .3 Identify activities that are behind schedule and causing delay. Provide measures to regain slippage.
  - .1 Corrective measures may include:
    - .1 Increase of personnel with more experience/qualifications on site for effected activities or work package.
    - .2 Increase in materials and equipment.
    - .3 Overtime work or Additional work shifts.
- .4 Submit to Owner's representative and Consultant, justification, project schedule data and supporting evidence for approval of extension to Contract completion date or interim milestone date when required. As part of supporting evidence, include:
  - .1 Written submission of proof of delay based on revised activity logic, duration and costs, showing time impact analysis illustrating influence of each change or delay relative to approved contract schedule.
  - .2 Prepared schedule indicating how change will be incorporated into overall logic diagram. Demonstrate perceived impact based on date of occurrence of change and include status of construction at that time.
  - .3 Other supporting evidence requested by Owner's representative or Consultant.
  - .4 Do not assume approval of Contract extension prior to receipt of written approval from Owner's representative and Consultant.
- .5 In event of Contract extension, display in Detail Schedule that scheduled float time available for work involved has been used in full without jeopardizing earned float.
  - .1 Consultant will determine and advise Contractor number of allowable days for extension of Contract based on project schedule updates for period in question, and other factual information.
  - .2 Construction delays affecting project schedule will not constitute justification for extension of contract completion date.

#### **1.12 PROGRESS AND REPORTING**

- .1 On an ongoing basis, Detail Schedule on job site to show "Progress to Date". Arrange participation on and off site of subcontractors and suppliers, as, and when necessary, for purpose of network planning, scheduling, updating and progress monitoring. Inspect Work with Owner's representative and Consultant at least once monthly to establish progress on each current activity shown on applicable networks.
- .2 Update and reissue project Work Breakdown Structure and relevant coding structures as project develops and changes.
- .3 Perform Detail Schedule update monthly with status dated (Data Date) on last working day of month. Update to reflect activities completed to date, activities in progress, logic and duration changes.
- .4 Do not automatically update actual start and finish dates by using default mechanisms found in project management software.

- .5 Submit to Owner's representative and Consultant copies of updated Detail Schedule.
- .6 Requirements for monthly progress monitoring and reporting are basis for progress payment request. Payment may be withheld until acceptable and current schedule is received.
- .7 Submit bi-weekly written report based on Detail Schedule, showing Work to date performed, comparing Work progress to planned, and presenting current forecasts. Report summarize progress, defining problem areas and anticipated delays with respect to Work schedule, and critical paths. Explain alternatives for possible schedule recovery to mitigate potential delay. Include in report:
  - .1 Description of progress made.
  - .2 Pending items and status of: permits, shop drawings, change orders, possible time extensions.
  - .3 Status of Contract completion date and milestones.
  - .4 Current and anticipated problem areas, potential delays and corrective measures.
  - .5 Review of progress and status of Critical Path activities.

## **2 PRODUCTS**

### **2.01 NOT USED**

- .1 Not used.

## **3 EXECUTION**

### **3.01 NOT USED**

- .1 Not used.

**END OF SECTION**



## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 01 43 00 - Quality Assurance

### **1.02 REFERENCE STANDARDS**

- .1 Not Used.

### **1.03 ADMINISTRATIVE REQUIREMENTS**

- .1 Submit to Consultant and Owner's representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Samples shall be mailed or hand delivered to both Consultant and Owner unless arrangement for pick-up specifically coordinated with an on-site meeting. Hand over at an on-site meeting is only an acceptable option if it does not cause delay in project schedule.
- .3 Do not proceed with Work affected by submittal until review is complete.
- .4 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .5 Where items or information is not produced in SI Metric units converted values are acceptable.
- .6 Review submittals before submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .7 Notify Consultant, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .8 Verify site measurements and affected adjacent Work are coordinated.
- .9 Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review of submittals.
- .10 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant review.
- .11 Keep one (1) reviewed copy of each submission on site.

### **1.04 SHOP DRAWINGS AND PRODUCT DATA**

- .1 Refer to CCDC 2 GC 3.11.
- .2 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .3 Submit drawings stamped and signed by professional engineer registered or licensed in Province, Canada.

- .4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to Contract drawings and specifications.
- .5 Allow ten (10) business days for Consultant's review of each submission.
- .6 Adjustments made on shop drawings by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant before to proceeding with Work.
- .7 Make changes in shop drawings as Consultant may require, consistent with Contract Documents. When resubmitting, notify Consultant in writing of revisions other than those requested.
- .8 Accompany submissions with transmittal letter, containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data, and sample.
  - .5 Other pertinent data.
- .9 Submissions to include:
  - .1 Date and revision dates.
  - .2 Project title and number.
  - .3 Name and address of:
    - .1 Subcontractor.
    - .2 Supplier.
    - .3 Manufacturer.
  - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of site measurements and compliance with Contract Documents.
  - .5 Details of appropriate portions of Work as applicable:
    - .1 Fabrication.
    - .2 Layout, showing dimensions, including identified site dimensions and clearances.
    - .3 Setting or erection details.
    - .4 Capacities.
    - .5 Performance characteristics.
    - .6 Standards.
    - .7 Operating weight.

- .8 Wiring diagrams.
- .9 Single line and schematic diagrams.
- .10 Relationship to adjacent work.
- .10 After Consultant's review, distribute copies.
- .11 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Consultant may reasonably request.
- .12 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Consultant where shop drawings will not be prepared due to standardized manufacture of product.
- .13 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Consultant.
  - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
  - .2 Testing must have been within two (2) years of date of Contract award for project.
- .14 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Consultant.
  - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
  - .2 Certificates must be dated after award of Contract complete with project name.
- .15 Submit electronic copies of manufacturers instructions for requirements requested in specification Sections and as requested by Consultant.
  - .1 Pre-printed material describing installation of product, system or material, including special notices and Safety Data Sheets concerning impedances, hazards and safety precautions.
- .16 Submit electronic copies of Manufacturer's Site Reports for requirements requested in specification Sections and as requested by Consultant.
- .17 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .18 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Consultant.
- .19 Delete information not applicable to project.
- .20 Supplement standard information to provide details applicable to project.
- .21 If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

- .22 The review of shop drawings by Consultant and Owner is for sole purpose of ascertaining conformance with general concept.
  - .1 This review shall not mean that Consultant or Owner approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
  - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at the project site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for coordination of Work of Subcontractors.

#### **1.05 SAMPLES**

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Consultant's business address.
- .3 Notify Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant before proceeding with Work.
- .6 Make changes in samples which Consultant may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

#### **1.06 MOCK-UPS**

- .1 Erect mock-ups in accordance with section 01 43 00 - Quality Assurance.

#### **1.07 PHOTOGRAPHIC DOCUMENTATION**

- .1 Submit electronic copy of colour digital photography in .jpg format, standard resolution as directed by Consultant.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints: two (2) locations.
  - .1 Viewpoints and their location as determined by Consultant.
- .4 Frequency of photographic documentation: weekly and as directed by Consultant.
  - .1 Upon completion of: demolition, framing and services before concealment of Work, and as directed by Consultant.
- .5 Coordinate with Section 01 32 00 – Construction Progress Documentation.

**1.08 CERTIFICATES AND TRANSCRIPTS**

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.

**2 PRODUCTS**

**2.01 NOT USED**

- .1 Not Used.

**3 EXECUTION**

**3.01 NOT USED**

- .1 Not Used.

**END OF SECTION**

## 1 GENERAL

### 1.01 RELATED REQUIREMENTS

- .1 Section Section 01 56 00 - Temporary Barriers and Enclosures
- .2 Section Section 01 51 00 - Temporary Utilities

### 1.02 DEFINITIONS

- .1 Hot works: Work involving open flames or producing heat or sparks, including cutting, welding, soldering, brazing, grinding, adhesive bonding, roofing operations, thermal spraying and thawing pipes, and other similar operations.
- .2 Regulatory authority: Governmental agency or other authority which has jurisdiction over the matters in question.

### 1.03 REFERENCE STANDARDS

- .1 CSA Group (CSA):
  - .1 CSA Z1002:12, Occupational health and safety — Hazard identification and elimination and risk assessment and control
- .2 Employment and Social Development Canada (ESDC):
  - .1 [R.S.C., 1985, c. L 2, Canada Labour Code](#)
- .3 Government of Ontario:
  - .1 [R.S.O. 1990, C. 01 Occupational Health and Safety Act](#)
- .4 Health Canada (HC):
  - .1 [R.S.C. 1985, c. H-3, Hazardous Products Act](#)
  - .2 [SOR/2015 17, Hazardous Products Regulations](#)

### 1.04 ADMINISTRATIVE REQUIREMENTS

The Contractor must provide a completed approved registration form to the Ministry of Labour, Training and Skills Development before starting projects that meet the standards set out in section 6(1) of O. Reg 213/91, Construction Projects. Project designation is required in accordance with Construction Regulation 4 and must be obtained whenever multiple projects occur at the same workplace (civic address). Therefore, it is recommended to request a project designation as soon as the second project occurs and before work starts.

- .1 File notice of the project with regulatory authorities prior to beginning work.
- .2 Pre-construction safety meeting: Conduct a site meeting in accordance with Section 01 31 19 - Project Meetings and attended by the Owner, Consultant, and Subcontractors to:
  - .1 Verify project health and safety requirements.
  - .2 Review known or foreseeable health or safety hazards.
  - .3 Conduct a site risk assessment of hazards and prepare a risk mitigation plan.
  - .4 Ensure a mandatory safety information communication board is in place and all health and safety information clearly communicated to all site personnel.

#### **1.05 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Site-specific health and safety plan:
  - .1 Include, at minimum:
    - .1 Documentation requirements in accordance with CSA Z1002.
    - .2 On-site contingency and emergency response plans: Address standard operating procedures to be implemented during emergency situations.
    - .3 Results of site-specific safety hazard assessments.
    - .4 Results of safety and health risk or hazard analysis for site tasks and operation.
  - .2 Submit minimum ten (10) Working Days before beginning work at the work site.
    - .1 The Owner and Consultant may respond if concerns are noted.
    - .2 Resubmit, with noted corrections, of deficiencies or concerns before beginning work at the work site.
- .3 Submit electronic copies of health and safety inspection reports submitted to regulatory authorities.
- .4 Submit electronic copies of reports or directions issued by regulatory authorities.
- .5 Submit electronic copies of incident and accident reports.
- .6 Submit electronic copies of Workplace Hazardous Materials Information System (WHMIS) Safety Data Sheets (SDSs) in accordance with WORKPLACE HAZARDOUS MATERIAL INFORMATION SYSTEM in this section.
- .7 Medical surveillance: Submit certification of medical surveillance for site personnel where prescribed by regulatory requirements.
  - .1 Submit before starting work at the work site.
  - .2 Submit additional certifications for new site personnel.

#### **1.06 REGULATORY REQUIREMENTS**

- .1 Comply with the Canada Labour Code and related regulations.
- .2 Comply with the Government of Ontario's Occupational Health and Safety Act and related regulations.

#### **1.07 HEALTH AND SAFETY COORDINATOR**

- .1 Appoint a competent and authorized representative as health and safety coordinator to:
  - .1 Conduct health and safety training sessions; prevent people or persons without required training from entering the work site.
  - .2 Develop, enforce, and monitor the site-specific health and safety plan.
  - .3 Be on site during execution of the work.

- .4 Ensure all workers on site have provided current training certificates for the task being performed, and that all certificates are posted on the main health and safety communication board.
- .5 Ensure all permits (e.g., working at heights, hot work, etc.) are completed prior to start of any onsite work activities.
- .6 Monitor and enforce health and safety regulations and site requirements.
- .7 Remove any worker that is not following site health and safety requirements, or fails to comply with site's mandatory personal protective equipment (PPE) requirements.
- .2 Qualifications:
  - .1 Individual with working knowledge of occupational safety and health regulatory requirements and known or foreseeable hazards related to the work.

#### **1.08 SAFETY ASSESSMENT**

- .1 Perform site-specific safety hazard assessment in accordance with CSA Z1002.
- .2 Work at site is expected to involve:
  - .1 General construction hazards.
  - .2 Working at heights.
  - .3 Working in enclosed spaces (confined spaces).
  - .4 Work that produces any sparks, flames or heat and requires a hot work permit.
  - .5 Contact with asbestos-containing materials.
  - .6 Contact with lead-based paints.
  - .7 Contact with polychlorinated biphenyl (PCB).
  - .8 Contact with mould.
  - .9 Contact with any chemical used for site works and activities.
- .3 Develop written site-specific health and safety plan, referencing the project specifications and based on hazard assessment, before beginning work at the work site.

#### **1.09 GENERAL REQUIREMENTS**

- .1 Prioritize safety and health of the public and site personnel and protection of environment over cost and schedule considerations for the work.
- .2 Protect health and safety of people or persons on site or adjacent to the site, safety of property on site or adjacent to the site, people or persons adjacent to site and environment to extent that they may be affected by the work.
- .3 Assume the role of the constructor in accordance with the Government of Ontario's Occupational Health and Safety Act and related regulations.
- .4 Provide proper site separation and identification in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .5 Post applicable documents, articles, notices, and orders in conspicuous location on site in accordance with regulatory requirements.



- .6 Provide first aid facilities and an accident prevention program in accordance with regulatory requirement.
- .7 Provide appropriate emergency facilities, as specified in SDSs, where workers might be exposed to contact with chemicals, including eye-wash facilities and emergency showers.
  - .1 Train workers in use of emergency equipment.
- .8 Provide appropriate personal protective equipment as specified in SDSs.
  - .1 Properly fit workers for personal protective equipment.
  - .2 Train workers in care, use, and maintenance of personal protective equipment.

#### **1.10 FIRE SAFETY REQUIREMENTS**

- .1 Comply with National Fire Code of Canada (NFC), Section 5.2., Hot Works, and Section 5.6., Construction and Demolition Sites.
- .2 Comply with the Owner's hot work management program; obtain hot work permits as required.
- .3 Ventilate areas of hot work by use of suitable portable supply and exhaust fans.
- .4 Ventilate hot work in enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.
- .5 Provide continuous fire watch during hot work and for minimum one (1) hour after. Perform final visual inspection after fire watch completion or four (4) hours after completion of the work.
  - .1 Use thermal scanners or infrared thermometers to take temperature readings if visual inspection is impeded by obstructions.
- .6 Comply with the Owner's fire suppression by-pass requirements, hot work requirements, fire watch policies and procedures, and the below requirements:
  - .1 Provide continuous fire watch (minimum once per hour) during fire suppression by-pass times and hot works construction activities, as required in length and quantity to complete the Work outlined in the Contract Documents.
  - .2 Contractor responsible for fire watch on the fourth floor at all times.
  - .3 Owner to complete fire watch on all other levels of the building, where coordinated with the Owner's representative in advance, during business hours until 23:00 (Monday through Friday).
  - .4 Contractor responsible to retain Owner's security at posted rates for weekends, holidays, and after hours work between 23:00 to 7:00.
- .7 Burning rubbish or construction waste materials: not permitted.

#### **1.11 UNFORSEEN HAZARDS**

- .1 When unforeseen or peculiar safety-related factors, hazards, or conditions occur during the work, follow procedures in place in accordance with employees' rights to refuse work and other regulatory requirements. Advise the health and safety coordinator, Owner, and Consultant verbally and in writing.

#### **1.12 WORKPLACE HAZARDOUS MATERIAL INFORMATION SYSTEM**

- .1 Provide products that comply with Hazardous Products Regulations and other regulatory requirements regarding use, handling, labelling, storage, and disposal of hazardous materials.
- .2 Deliver copies of applicable SDSs to the work site, Owner, and Consultant. Provide SDSs in compliance with Hazardous Products Regulations for hazardous products that will be used in the work. Locate SDSs in accessible locations for workers and visitors throughout the site, bound and organized in binders.
  - .1 Maintain access to current SDSs on site at all times.
- .3 Deliver hazardous products to site only after delivery of acceptable SDSs.
- .4 Train workers required to use or work in close proximity to hazardous products in accordance with regulatory requirements.
- .5 Label controlled products at work site in accordance with Hazardous Products Regulations and other regulatory requirements.

#### **1.13 BLASTING AND EXPLOSIVES**

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

#### **1.14 OVERLOADING**

- .1 Prevent loading any part of the structure during the construction with a load greater than it is calculated to bear safely when complete. Ensure temporary supports are as strong as permanent supports. Prevent placing loads on concrete floors until they have attained their permanent set.

#### **1.15 POWDER ACTUATED DEVICES**

- .1 Obtain written authorization from the Owner and Consultant before using powder actuated devices.

#### **1.16 CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by regulatory authorities or by the Owner and/or Consultant.
- .2 Submit written reports of actions taken to correct non-compliance.
- .3 The Owner and/or Consultant may stop work if non-compliance is not corrected.

### **2 PRODUCTS**

#### **2.01 NOT USED**

- .1 Not Used.

### **3 EXECUTION**

#### **3.01 EXAMINATION**

- .1 Not Used.

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END OF SECTION

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 01 33 00 – Submittal Procedures

### **1.02 DEFINITIONS**

- .1 Mock-up: A full-size physical example that demonstrates materials, finishes, interrelationship of materials and assemblies, aesthetic effects, and execution. A mock-up may demonstrate coordination of multiple Subcontractors' work. A mock-up establishes a standard by which the Work will be judged. Mock-ups are not samples.
- .2 Quality Assurance: Procedures for preventing defects and deficiencies before and during execution of the Work.
- .3 Quality Audit: Systematic and independent examination to determine whether [quality requirements](#) have been fulfilled as planned. A quality audit will examine processes, products and services to determine if they have been implemented effectively to achieve their specified objective.

### **1.03 REFERENCE STANDARDS**

- .1 ASTM International (ASTM):
  - .1 ASTM E329-20, [Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection](#)
- .2 International Organization for Standardization (ISO):
  - .1 ISO 9001:2015, Quality Management Systems – Requirements

### **1.04 SECTION INCLUDES**

- .1 This Section describes administrative and procedural requirements for proactive Contractor activities to assure the quality of construction before and during execution of the Work.

### **1.05 ADMINISTRATIVE REQUIREMENTS**

- .1 Contractor is responsible for self-performed testing and inspections and submittal of test reports to Owner and Consultant.
- .2 Owner will employ and pay for quality audit services performed through Owner's own forces by observation and testing to validate the Contractor's performance of the Work and perform whole building testing at completion of project, if deemed necessary.
- .3 Contractor to provide a Quality Management System that establishes a standardized approach to managing quality of materials and workmanship during the execution of Work in accordance with ISO 9001. Quality Management System will describe Contractor's contributions for testing and inspection programs as necessary for a successful Work.

### **1.06 ACTION AND INFORMATIONAL SUBMITTALS**

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

- .2 Submit a detailed testing and inspections schedule to Owner and Consultant in accordance with the Contractor's Quality Management System.
- .3 Submit certificates for products, process, and system for verification approval by Owner and Consultant.
- .4 Submit formal testing and inspections reports per ASTM E329 as indicated in technical specification Sections to Owner and Consultant in accordance with contractual agreement.
- .5 Submit one (1) digital copy of each quality assurance inspection and test report to Owner and Consultant, except where a technical specification Section indicates otherwise.
- .6 Submit mill test certificates as required in technical specification Sections and as indicated on Drawings.

#### **1.07 QUALIFICATIONS**

- .1 Manufacturers' Qualifications:
  - .1 specializes in manufacturing the products specified in the technical Section of the Project's construction specification.
  - .2 minimum three (3) years documented experience with a record of successful performance.
- .2 Suppliers' Qualifications:
  - .1 authorized to distribute manufacturer's products.
  - .2 has capacity to supply required products without delaying the Project.
- .3 Fabricators' Qualifications:
  - .1 experienced in producing products required for this Project.
  - .2 successful record of in-service performance.
  - .3 sufficient production capacity to fabricate required products without delaying the Project.
- .4 Installer Qualifications:
  - .1 firm or individual experienced in design and installation, application, and erection of materials to the extent required for this Project.
  - .2 successful record of in-service performance.
- .5 Testing and Inspecting Agency Qualifications:
  - .1 accredited organizations by the Standards Council of Canada for testing and inspection.
  - .2 capable of reliably performing testing of building products and inspections of construction activities in accordance with ISO 9001 and ASTM E329.
- .6 Licensed Professionals Qualifications:
  - .1 individual registered or licensed to practice their respective design profession as defined by the statutory requirements of the professional registration laws of the state or jurisdiction in which the project is to be constructed.

## **1.08 CERTIFICATIONS**

- .1 Ensure that certification of products, processes, and systems includes physical and examination testing as specified in ASTM E329 ISO 9001 to confirm compliance with Specifications requirements.

## **1.09 COORDINATION**

- .1 Coordinate and schedule tests and inspections with accredited testing and inspection agencies as indicated in Contract Documents and in accordance with ASTM E329 requirements.

## **1.10 SITE SAMPLES**

- .1 Obtain Owner and Consultant's acceptance to proceed with the sampling process.
  - .1 Testing agency is responsible for obtaining representative samples of those materials required to be tested and evaluated as directed by Owner and Consultant in accordance with the Contractual Documents.
- .2 Ensure testing agency performs sampling in accordance with ASTM E329.
  - .1 When sampling collection is required by testing agency, ensure proper protection, handling and storing of samples.
- .3 Testing agency to document procedures and appropriate techniques to select samples.
- .4 Record details of environmental conditions present during the sampling, such as rain or freezing weather that may affect testing of sample or interpretation of test results.

## **1.11 MOCK-UPS**

- .1 Mock-ups can be used as a reference for assessing quality of workmanship and site-applied finishes as requested in the project's Contract Documents.
- .2 Obtain Owner and Consultant's acceptance of mock-ups installation before beginning to install those portions of the Work represented by the mock-up.
- .3 Assemble mock-ups at the Place of the Work in locations acceptable to Owner and Consultant or where location is indicated in the technical specification Section.
- .4 Schedule mock-ups ready for Owner and Consultant's review and in orderly sequence, to avoid delays in Work.
  - .1 Failure to prepare mock-ups in ample time is not considered sufficient reason to request an extension of Contract Time. Claims for extension of Contract Time by reason of such default will not be considered.
- .5 If requested, Owner and/or Consultant will assist in scheduling dates for construction of mock-ups.
- .6 Construct mock-ups using materials, finishes, colours, and methods proposed for the completed Work. Mock-ups to demonstrate proposed workmanship and range of aesthetic appearance.
- .7 Where a mock-up represents or affects multiple specification Sections, coordinate activities of these Subcontractors to ensure mock-ups are complete.
- .8 Modify or replace mock-ups when unacceptable to Owner and/or Consultant.

- .9 Maintain acceptable mock-ups in an undisturbed condition as a standard for judging the completed Work.
- .10 Demolish and remove mock-ups at conclusion of the Work or when acceptable to Owner and Consultant.

## **2 PRODUCTS**

### **2.01 NOT USED**

- .1 Not Used.

## **3 EXECUTION**

### **3.01 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **1 GENERAL**

### **1.01 SUMMARY**

- .1 This Section describes administrative and procedural requirements for reactive activities to verify that completed Work conforms to Contract Documents requirements.
- .2 Having inspection and testing agencies by Contractor or Owner does not relieve the Contractor of their responsibility to perform Work in accordance with Contract Documents.

### **1.02 RELATED REQUIREMENTS**

- .1 Section 01 21 00 – Allowances
- .2 Section 01 33 00 – Submittal Procedures

### **1.03 ADMINISTRATIVE REQUIREMENTS**

- .1 Allow and coordinate access to Work on site, manufacturing off site, and fabrication off site with inspection and testing agencies.
- .2 Retain and pay for inspection and testing that are designated for Contractor's own quality control plan, and when testing and inspection are required by AHJ.
- .3 Give advanced notice to Owner, Consultant, and to each inspection/testing agency for inspection and testing required by Contract Documents or by AHJ.
- .4 In advance of each test, notify appropriate agency, Owner, and Consultant in the order that attendance arrangements can be made.

### **1.04 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit schedule of testing and inspection activities to Consultant, Owner, applicable Subcontractors, testing agencies, and other affected parties. Include the following:
  - .1 List each testing and inspection agency
  - .2 Identify types of tests and inspections for each agency, and cross reference to applicable specification Section number-title in Contract Documents
  - .3 Description of test and inspection
  - .4 Identify applicable reference standard
  - .5 Identify test and inspection method
  - .6 Indicate number of each test and inspection required
- .3 Submit one (1) digital copy of each quality assurance inspection and test report to Owner and Consultant, except where a technical specification Section indicates otherwise.
- .4 Submit reports for inspection and testing required by Contract Documents or by AHJ and performed by Contractor-retained inspection and testing agencies within ten days after inspection or test is completed, except where a technical specification Section indicates a different time period.



- .5 Submit one (1) digital copy of each quality control inspection and test report to Owner and Consultant except where a technical specification Section indicates otherwise.
- .6 Deliver copies of quality control reports to Subcontractor of work being inspected or tested.

#### **1.05 SITE QUALITY CONTROL PROCEDURES**

- .1 Provide labour, Construction Equipment, and temporary facilities to obtain and handle test samples and materials on site. Arrange for sufficient space to store and cure test samples.
- .2 Deliver samples and materials required for testing, as requested in technical specification Sections. Submit with reasonable promptness and in an orderly sequence to avoid delays in Work.

#### **1.06 TESTING AND INSPECTION SERVICES**

- .1 Owner will retain and pay for independent inspection and testing agencies or will use own forces to inspect, test, or perform other quality control reviews of parts of the work, except where indicated otherwise.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Correct defects and deficiencies when they are revealed during inspection or testing as advised by Owner and Consultant at no change to the Contract Amount or Contract Time. Pay costs for retesting and re-inspection. Appointed agency or Owner's own forces will request additional inspections or tests to ensure full degree of defects or deficiencies are revealed and corrected.
- .4 Quality control testing and inspection reports to include the following:
  - .1 Project name and number
  - .2 Testing/Inspection agency's name, address, telephone number, and website
  - .3 Date of issuing report
  - .4 Dates and locations of tests, inspections, or samples
  - .5 Description of the Work and test and inspection method
  - .6 Numbers and titles of associated specification Sections
  - .7 Test and inspection data and interpretation of test results (e.g., pass or fail)
  - .8 Ambient conditions at time of test, inspection, or sampling
  - .9 Recommendations on re-testing and re-inspecting, if applicable

### **2 PRODUCTS**

#### **2.01 NOT USED**

- .1 Not Used.

**3 EXECUTION**

**3.01 NOT USED**

.1 Not Used.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 N/A

### **1.02 REFERENCE STANDARDS**

- .1 Not Used.

### **1.03 ACTION AND INFORMATIONAL SUBMITTALS**

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

### **1.04 TEMPORARY ELECTRICITY**

- .1 Owner will provide and pay for temporary electricity for lighting and operating of power tools during construction to a maximum supply of existing power within work area.
- .2 Arrange for connection with appropriate utility company. Pay costs for installation, maintenance, and removal.
- .3 Temporary electricity for electric equipment requiring a supply in excess of above is responsibility of Owner and based on General Conditions of Contract.
- .4 Electrical power systems installed under this Contract may be used for construction requirements only with prior approval from Owner if warranties are not affected.
  - .1 Repair damage to electrical system caused by use under this Contract.

### **1.05 TEMPORARY FIRE PROTECTION**

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.

### **1.06 TEMPORARY HEATING COOLING AND VENTILATING**

- .1 Provide temporary heating as required during construction period, including attendance, maintenance and fuel.
- .2 Construction heaters used inside building must be vented to outside or be of the flameless (vent free) type. Solid fuel salamanders are not permitted.
- .3 Provide temporary heat and ventilation in enclosed areas as required to:
  - .1 Facilitate progress of Work.
  - .2 Protect Work and Products against dampness and cold.
  - .3 Prevent moisture and condensation on surfaces.
  - .4 Provide ambient temperatures and humidity levels for storage, installation, and curing of materials.
  - .5 Provide adequate ventilation to meet health regulations for safe working environment.

- .4 Maintain minimum temperatures of ten degrees celsius (10 °C) in areas where construction is in progress.
- .5 Ventilating:
  - .1 Prevent accumulations of dust, fumes, mists, vapours, or gases in occupied areas during construction.
  - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
  - .3 Dispose of exhaust materials in a manner that will not result in harmful exposure to persons.
  - .4 Ventilate storage spaces containing hazardous or volatile materials.
  - .5 Ventilate temporary sanitary facilities.
  - .6 Continue operating ventilation and exhaust system after cessation of work process until complete removal of harmful contaminants is ensured.
- .6 Permanent heating, ventilating, and air conditioning system of building, may be used when available. Be responsible for damage to systems if use is permitted.
- .7 On completion of Work for which permanent heating system is used, replace filters at the end of the Project.
- .8 Ensure Date of Substantial Performance and Warranties for heating system does not start until entire system is in as near original condition as possible and is certified by Consultant.
- .9 Owner will pay utility charges where temporary heat source is the existing building equipment unless otherwise outlined in the Invitation to Tender (ITT).
- .10 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
  - .1 Conform with applicable codes and standards.
  - .2 Enforce safe practices.
  - .3 Prevent abuse of services.
  - .4 Prevent damage to finishes.
  - .5 Vent direct-fired combustion units to outside.
- .11 Be responsible for damage to Work due to failure to provide adequate heat and protection during construction.

#### 1.07 TEMPORARY LIGHTING

- .1 Provide and maintain temporary lighting throughout Project. Ensure level of illumination on all floors is not less than 162 lux (lx).
- .2 Electrical lighting systems installed under this Contract may be used for construction requirements only with prior approval of Owner if warranties are not affected.
  - .1 Repair damage to lighting systems caused by use under this Contract.
  - .2 Replace lamps that have been used for more than three (3) months.

**1.08 TEMPORARY TELECOMMUNICATIONS**

- .1 Provide and pay for temporary telephone, fax, data hook up lines, and equipment necessary for own use.

**1.09 TEMPORARY WATER**

- .1 Owner will provide continuous supply of potable water for construction use.
- .2 Arrange for connection with appropriate utility company and pay costs for installation, maintenance, and removal.
- .3 Owner will pay for utility charges at prevailing rates, based on General Conditions of Contract and as outlined in the Invitation to Tender (ITT).

**2 PRODUCTS**

**2.01 NOT USED**

- .1 Not Used.

**3 EXECUTION**

**3.01 INSTALLATION AND REMOVAL**

- .1 Provide temporary utilities to execute Work expeditiously.
- .2 Remove all such temporary utilities from site after use.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 N/A

### **1.02 REFERENCE STANDARDS**

- .1 Not Used.

### **1.03 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Special procedure submittals:
  - .1 Submit copies of submittals for temporary barriers and enclosures required by the authority having jurisdiction (AHJ) before installation.
    - .1 Temporary barriers and enclosures requiring design by a qualified professional:
      - .1 Signed and sealed by a qualified professional in accordance with Section 01 43 00 – Quality Assurance.

### **1.04 GENERAL REQUIREMENTS**

- .1 Erect temporary barriers and enclosures to protect the public, occupants, spaces, adjacent properties, and to secure the work site in accordance with the Authorities Having Jurisdiction (AHJ) and to the satisfaction of the Owner's representative and Consultant.
  - .1 Provide signage as required by local regulatory requirements.
- .2 Maintain temporary barriers and enclosures in good condition, and relocate when required, until affected work is complete.
- .3 Remove temporary barriers and enclosures from site after use.
- .4 Notwithstanding the Contractor's responsibilities for the design, erection, operation, maintenance and removal of temporary work in the General Conditions, this section includes some prescriptive requirements

### **1.05 TEMPORARY AIR BARRIERS**

- .1 Temporary weathertight enclosures:
  - .1 Erect insulated enclosures to unfinished door and window openings, tops of shafts, and at other openings through floors, walls, and roofs.
  - .2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heating.
  - .3 Design enclosures to withstand wind pressure and snow loads.

**1.06 TEMPORARY DUST BARRIERS**

- .1 Erect temporary dust-tight screens, partitions, or enclosures to isolate dust generating activities.
  - .1 Seal at floors, ceilings, and walls.
  - .2 Protect means of egress with dust-tight zippers, magnetic closure doors, or similar means to keep dust isolated.

**1.07 TEMPORARY NOISE BARRIERS**

- .1 Provide temporary acoustical barriers or enclosures to reduce sound transmission from noise generating work.

**1.08 TEMPORARY PROTECTIVE WALKWAYS**

- .1 Erect protective walkways as required.

**2 PRODUCTS**

**2.01 NOT USED**

- .1 Not used.

**3 EXECUTION**

**3.01 NOT USED**

- .1 Not used.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 N/A

### **1.02 REFERENCE STANDARDS**

- .1 Within text of each specifications section, reference may be made to reference standards.
- .2 Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .3 If there is question as to whether products or systems are in conformance with applicable standards, Consultant reserves right to have such products or systems tested to prove or disprove conformance.

### **1.03 QUALITY**

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Should disputes arise as to quality or fitness of products, decision rests strictly with Owner and Consultant based upon requirements of Contract Documents.
- .4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

### **1.04 AVAILABILITY**

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

### **1.05 STORAGE, HANDLING AND PROTECTION**

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.



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

#### **1.06 TRANSPORTATION**

- .1 Pay costs of transportation of products required in performance of Work.
- .2 Transportation cost of products supplied by Owner will be paid for by Owner. Contractor to Unload, handle and store such products.

#### **1.07 MANUFACTURER'S INSTRUCTIONS**

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

#### **1.08 QUALITY OF WORK**

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Consultant if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Owner and Consultant reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Owner and Consultant, whose decision is final.

**1.09 CO-ORDINATION**

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

**1.10 CONCEALMENT**

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

**1.11 REMEDIAL WORK**

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

**1.12 LOCATION OF FIXTURES**

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

**1.13 FASTENINGS**

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

**1.14 FASTENINGS - EQUIPMENT**

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.

- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

#### **1.15 PROTECTION OF WORK IN PROGRESS**

- .1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Consultant.

#### **1.16 EXISTING UTILITIES**

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

### **2 PRODUCTS**

#### **2.01 NOT USED**

- .1 Not Used.

### **3 EXECUTION**

#### **3.01 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 N/A

### **1.02 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit the following before work begins at the Place of the Work:
  - .1 Service locations: Document locations and extents of service lines in the work area.
- .3 Submit the following informational submittals as work progresses:

### **1.03 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 – Closeout Submittals.

### **1.04 QUALIFICATION ASSURANCE**

- .1 Not Used.

## **2 PRODUCTS**

### **2.01 NOT USED**

- .1 Not Used.

## **3 EXECUTION**

### **3.01 EXAMINATION**

- .1 Existing Services:
  - .1 Confirm locations and extent of service lines in work area before beginning work on site. Submit findings.
  - .2 Immediately notify the Owner and Consultant if unknown services are encountered. Confirm findings in writing.
  - .3 Record locations of maintained, re-routed, and abandoned service lines after completion of the Work. Submit findings.
- .2 Verify substrate and other conditions are acceptable for installation of materials, assemblies, and systems in accordance with required tolerances and manufacturer's instructions and recommendations.
  - .1 Examine conditions, with installers, for defects affecting performance of the Work. Where work of one Section depends on work of other Sections being properly completed, verify that work is complete and suitable to receive the subsequent work.
  - .2 Verify substrate surfaces are clean, dimensionally-stable, cured, and free of contaminants.

- .3 Proceed with installation after unacceptable conditions are remedied.
- .4 Starting to cut, patch, or install work will be considered Contractor's acceptance of existing conditions.
- .5 Monitor conditions as Work proceeds, including items subject to damage or movement during cutting and patching.
- .3 Perform manufacturer-recommended pre-installation site tests.

### **3.02 PREPARATION**

- .1 Protection of In-Place Conditions:
  - .1 Protect Work and items to remain from damage.
  - .2 Do not load, or permit to be loaded, anything with a weight or force that may endanger the safety or integrity of the Work or items to remain.
  - .3 Support structural integrity of surroundings.
  - .4 Protect exposed work from weather and other potentially damaging conditions. Keep excavations free of water.
  - .5 Promptly remove, replace, clean, or repair elements damaged due to inadequate protection, as acceptable to the Owner and Consultant, and at no change to the Contract Price or Contract Time.
- .2 Surface Preparation:
  - .1 Clean surfaces thoroughly before installation.
  - .2 Prepare surfaces using manufacturer-recommended methods to achieve acceptable substrates under project conditions.

### **3.03 SURVEY REQUIREMENTS**

- .1 Not Used.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 N/A

### **1.02 SECTION INCLUDES**

- .1 Common requirements for installing, applying, and erecting products. Includes procedures and submittals for cutting and patching to existing conditions, and required repairs arising from tests and destructive inspections.

### **1.03 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit proof of anchor and fastener load carrying capacity for a work result, when requested.
- .3 Submit written request before cutting or altering to existing conditions which may affect the following:
  - .1 structural integrity of existing elements: Submit structural details and calculations performed by a professional structural engineer registered or licensed in Ontario, Canada. Include evidence of unsatisfactory structural integrity of the elements according to Consultant;
  - .2 integrity of weather-exposed and moisture-resistant elements;
  - .3 efficiency, maintenance, safety, or accessibility of operational elements;
  - .4 visual qualities of sight-exposed elements; and
  - .5 Work of Owner or other contractor(s).
- .4 Submit a request for cutting or altering which includes:
  - .1 identification of the Project; and
  - .2 location and description of affected existing conditions including changes to structural elements, function of elements, and visual appearance of existing elements; and the location and identification of utilities that will be temporarily out of service during cutting and patching activities.
- .5 Submit site plan drawings indicating relative location of various services and equipment upon the request of Owner and Consultant.
- .6 Submit a work plan including:
  - .1 a statement why cutting or altering is unavoidable and describe alternatives to cutting and patching if available;
  - .2 a description of proposed work and proposed Products;
  - .3 the effect of cutting or altering on work by Owner or other contractors;
  - .4 written acknowledgement by other contractors affected by cutting or altering, if applicable; and
  - .5 proposed date(s) and time(s) work will be executed.

## **1.04 QUALIFICATIONS**

- .1 Licensed Professionals: Engage a structural engineer licensed at the Place of the Work, to submit details and calculations when altering existing structural elements or when required elsewhere in the Specifications for this project.

## **2 PRODUCTS**

### **2.01 MATERIALS**

- .1 Patching Materials: If possible, use the same materials found in the existing conditions, except in fire-resistance rated materials and assemblies.
- .2 Materials Visible from the Floor Area: Use materials that visually match existing adjacent surfaces, and match existing functional performance.

## **3 EXECUTION**

### **3.01 COMMON INSTALLATION/APPLICATION/ERECTION REQUIREMENTS**

- .1 Fit several parts together, to integrate with other Work.
- .2 Remove and replace defective and non-conforming Work.
- .3 Unless otherwise indicated in specifications, install, or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .4 Notify Consultant in writing, of conflicts between specifications and manufacturer's instructions, so that Consultant will establish course of action.
- .5 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Consultant to require removal and re-installation at no increase in Contract Price or Contract Time.
- .6 Provide openings in non-structural elements for penetrations of mechanical and electrical work.
- .7 Conceal pipes, ducts and wiring in floor, wall, partition, and ceiling assemblies in finished areas, except where indicated otherwise.
- .8 In addition to the manufacturer's recommendations for safety, access, accessibility, and maintenance, locate equipment, fixtures, and distribution systems where it shall provide minimal interference and shall maximize on usable space.
  - .1 Location of equipment, fixtures, and outlets indicated on Drawings and specifications are approximate.
  - .2 Notify Owner and Consultant of impending installation and obtain approval for actual locations.

### **3.02 BRACING AND ANCHORING**

- .1 Anchors and Fasteners: Unless otherwise indicated elsewhere:
  - .1 Provide any necessary anchors and fasteners to fasten each component securely for its intended purpose. Allow for building movement, including from thermal expansion and contraction of materials and assemblies;

- .2 prevent electrolytic reaction between dissimilar metals and materials;
  - .3 Provide hot-dip galvanized steel anchors and fasteners for securing exterior work;
  - .4 locate anchors and fasteners within individual load limit or shear capacity. Ensure anchors and fasteners are permanently secured;
  - .5 Where exposed to view, evenly distribute anchors and fasteners in a single area; and
  - .6 Where exposed to view, provide metal anchors, fasteners, and related accessories with the same texture, colour, and finish as adjacent materials.
- .2 Non-Conforming Work: Anchors and fasteners installed which cause substrate cracks or spalling is not acceptable.

### **3.03 CUTTING AND PATCHING**

- .1 Proceed with cutting and patching after the review and acceptance by the Consultant of all submittals listed in Article 1.03, Actions and Informational Submittals.
- .2 Perform cutting, fitting, and patching to complete Work in accordance with related technical specification Sections.
- .3 Use special techniques to avoid damaging existing conditions that will remain, and which will result in proper surfaces to receive patching and finishing.
- .4 Employ original installer to perform cutting and patching for weather-exposed elements, moisture-resistant elements, and surfaces exposed to view.
- .5 Cut rigid materials using masonry saw, core drill, or other tool recommended by the product manufacturer or applicable industry association. Pneumatic or impact tools are not allowed on masonry work without the approval of Owner and Consultant.
- .6 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces unless otherwise specified by Consultant. At penetration of fire-rated wall, ceiling, or floor construction, completely seal voids with fire stopping material, full thickness of construction element.
- .7 Refinish surfaces to match adjacent finishes. Refinish continuous surfaces to nearest intersection (e.g., edges of partition). Refinish assemblies by refinishing entire unit. Provide entire surface with uniform finish, colour, and texture.
- .8 Ensure that all cutting and patching work, including that paid for by Mechanical and Electrical Subcontractors, is properly performed by the respective trades skilled in that line of work. Restore work with new products in accordance with Contract Documents.

### **3.04 ADJUSTING**

- .1 Remove and replace patching that is visually unsatisfactory to Owner and Consultant

**END OF SECTION**



## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 01 33 00 - Submittal Procedures

### **1.02 REFERENCE STANDARDS**

- .1 CSA Group/International Organization for Standardization (CSA ISO):
  - .1 CSA ISO 14024:20, Environmental labels and declarations – Type 1 – environmental labelling – Principles and procedures
- .2 United States Environmental Protection Agency (EPA):
  - .1 EPA's Safer Choice Standard, 2009
- .3 Green Seal, Inc. (GS):
  - .1 GS-34-2017, Green Seal Standard for Cleaning and Degreasing Agents
  - .2 GS-37-2022, Green Seal Standard for Cleaning Products for Industrial and Institutional Use
  - .3 GS-40-2020, Green Seal Standard for Floor-Care Products for Industrial and Institutional Use
- .4 Underwriters' Laboratories Inc. (UL):
  - .1 UL 2759-2011, Standard for Sustainability for Hard Surface Cleaners
  - .2 UL 2767-2011, Standard for Paint and Varnish Remover
  - .3 UL 2777-2011, Standard for Sustainability for Hard Floor Care Products
  - .4 UL 2791-2012, Standard for Sustainability for Drain and/or Grease Trap Additives
  - .5 UL 2792-2012, Standard for Sustainability for Cleaning and Degreasing Compounds: Biologically-based
  - .6 UL 2795-2012, Standard for Sustainability for Carpet and Upholstery Care Products
  - .7 UL 2796-2012, Standard for Sustainability for Odor Control Products
  - .8 UL 2798-2012, Standard for Sustainability for Biological Digestion Additives for Cleaning and Odour Control

### **1.03 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination:
  - .1 Coordinate with all mechanical and electrical specifications for related cleaning requirements.
  - .2 Notify the Owner and Consultant if cleaning is required due to actions of the Owner or other contractors.
- .2 Scheduling: Schedule cleaning operations so resulting dust and other contaminants will not fall on recently painted surfaces or contaminate building ventilation systems.

#### **1.04 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: Product literature and data sheets for cleaning products, including product characteristics, performance criteria, WHMIS SDSs, intended uses (surfaces to be cleaned with each product).

### **2 PRODUCTS**

#### **2.01 NOT USED**

- .1 Not Used.

### **3 EXECUTION**

#### **3.01 PREPARATION**

- .1 Provide adequate temporary ventilation during use of volatile or noxious cleaning substances.

#### **3.02 GENERAL REQUIREMENTS**

- .1 Use cleaning products recommended by, or acceptable to, the manufacturer of surfaces to be cleaned. Use cleaning products that will not void installed products' warranties.
- .2 Use cleaning products in accordance with manufacturer's instructions.
- .3 Test each cleaning product and procedure in a small inconspicuous area to verify no adverse reaction occurs with surface before proceeding with cleaning remainder of surface.
- .4 Clean stained surfaces as soon as possible.

#### **3.03 PROGRESS CLEANING**

- .1 Maintain the Work in a tidy and safe condition, free from accumulation of waste materials and debris, including when caused by the Owner or other contractors.
- .2 Remove dust, debris, and other contaminants from wall and other cavities before enclosing.
- .3 Clean interior areas before start of finish work. Maintain areas free of dust and other contaminants during finishing operations.
- .4 Clean dirt or mud tracked onto paved or surfaced roadways.
- .5 Clear snow and ice from designated contractor exterior storage and/or office facilities in accordance with local regulations. Pile cleared snow in designated areas.

#### **3.04 FINAL CLEANING**

- .1 Immediately following Date of Substantial Performance, and prior to Owner occupancy of the building or portion of the building affected by the Work, conduct full and complete final cleaning operations.

- .2 Final cleaning operations shall be performed by an experienced professional cleaning company, possessing equipment and personnel sufficient to perform full building cleaning operations.
- .3 Remove surplus products, tools, construction machinery, and equipment not required for performance of remaining Work before Consultant's final review.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction (AHJ) for disposal of waste and debris.
- .5 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .6 Replace broken, scratched, or otherwise disfigured glass and mirrors.
- .7 Clean inside of all millwork and cabinetry.
- .8 Clean and polish exposed glass, mirrors, stainless steel, and chrome-surfaces.
- .9 Clean hardware, wall tile, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures.
- .10 Remove stains, spots, marks, and dirt from decorative work, electrical and mechanical fixtures, furniture, fitments, walls, and floors.
- .11 Remove dust and vacuum interior building surfaces, behind grilles, louvres, and screens.
- .12 Wax, seal, or otherwise apply treatments to floor finishes as recommended by each flooring manufacturer.
- .13 Steam clean all carpets where stained or soiled.
- .14 Remove all paint spots or overspray from all affected areas including:
  - .1 mechanical nameplates;
  - .2 electrical nameplates; and
  - .3 permanent labels required by authorities having jurisdiction or regulatory agencies, such as CSA, cUL, NFPA, ULC, WHI, etc.
- .15 Clean plumbing fixtures to a sanitary condition.
- .16 Clean permanent filters and replace disposable filters for plumbing and HVAC equipment used during construction.
- .17 Remove dust and other contaminants from lighting reflectors, lenses, lamps, bulbs, and other lighting surfaces.
- .18 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
- .19 Clean and sweep roofs, gutters, areaways, downspouts, sunken window wells, and related drainage systems.
- .20 Remove dirt and other disfiguration from exterior building surfaces.
- .21 Re-clean areas soiled by workers before Owner occupancy.
- .22 Broom clean and power wash exterior sidewalks and stairs.
- .23 Sweep and power wash clean paved areas, including parking areas and roads.
- .24 Clean landscaped areas of construction-related waste.

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SECTION 01 74 00  
Cleaning  
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END OF SECTION

## **1 GENERAL**

### **1.01 SUMMARY**

- .1 The Owner intends for this project to generate the least amount of waste possible and to reduce construction and demolition waste disposed of in landfills and incineration facilities by recovering, reusing, and recycling materials.
- .2 Section includes:
  - .1 Requirements for management and disposal of construction and demolition waste.

### **1.02 RELATED REQUIREMENTS**

- .1 Section 01 31 19 - Project Meetings
- .2 Section 01 33 00 - Submittal Procedures
- .3 Section 01 74 00 - Cleaning

### **1.03 DEFINITIONS**

- .1 Alternative daily cover: Material, other than soils, installed in landfills to cover and seal each day's trash.
- .2 Construction and demolition waste: Solid and liquid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, renovation, repair, or demolition operations.
- .3 Construction and demolition waste management plan: A project-specific plan for the collection, transportation, and disposal of the waste generated at the Place of the Work; the purpose of the plan is to ultimately reduce the amount of material being landfilled.
- .4 Hazardous: Exhibiting the characteristics of hazardous substances including properties such as ignitability, corrosiveness, toxicity, or reactivity.
- .5 Return: To give back reusable items or unused products to vendors for credit.
- .6 Reuse: To reuse a construction waste material in some manner on the work site.
- .7 Salvage: To remove a waste material from the work site to another site for resale or reuse by others.
- .8 Toxic: Poisonous to humans either immediately or after a long period of exposure.
- .9 Trash: Any product or material unable to be reused, returned, recycled, or salvaged. A type of waste.
- .10 Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.
- .11 Waste management coordinator: The on-site representative responsible for supervising waste management activities, instructing workers, and documenting results of the construction and demolition waste management plan.

#### **1.04 REFERENCE STANDARDS**

- .1 ASTM International (ASTM):
  - .1 ASTM E3073-17, Standard Guide for Development of Waste Management Plan for Construction, Deconstruction, or Demolition Projects
- .2 International Organization for Standardization (ISO):
  - .1 ISO 14000 family, Environmental management, current versions
- .3 International Organization for Standardization / International Electrotechnical Commission (ISO/IEC):
  - .1 ISO/IEC 17065:2012, Conformity assessment — Requirements for bodies certifying products, processes and services
- .4 Ontario Regulations
  - .1 102/94
  - .2 103/94

#### **1.05 ADMINISTRATIVE REQUIREMENTS**

- .1 Make arrangements with and obtain permits from authorities having jurisdiction (AHJs) for disposal of waste.
- .2 Pre-construction meetings: Conduct a site meeting in accordance with Section 01 31 19 - Project Meetings and attended by the Consultant, the Owner, and appropriate Subcontractors to:
  - .1 Verify project requirements.
  - .2 Determine acceptable location for Contractor provided waste bins on site.

#### **1.06 ACTION AND INFORMATIONAL SUBMITTALS**

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

#### **1.07 QUALITY ASSURANCE**

- .1 Provide on-site instruction to site personnel:
  - .1 Describe appropriate separation, handling, and salvage, reuse, composting and return methods in accordance with authorities having jurisdiction.

### **2 PRODUCTS**

#### **2.01 NOT USED**

- .1 Not used.

### **3 EXECUTION**

#### **3.01 PREPARATION**

- .1 Execute work with least possible interference or disturbance to normal use of premises.

- .2 Provide and maintain on-site garbage for landfill and any other type of containers deemed necessary for collection of waste.
- .3 Locate waste facilities and on-site containers minimum three (3) m away from buildings, unless otherwise instructed by Owner.
- .4 Maintain security measures established by existing facility.
- .5 Provide temporary security measures as approved by Consultant.

### **3.02 WASTE MANAGEMENT REQUIREMENTS**

- .1 Implement the reviewed Owner and AHJ waste management requirements.
- .2 Minimize waste disposal to landfills.
- .3 Coordinate work with other activities at site to ensure timely and orderly progress of the work.
- .4 Keep bins and waste facilities neat, clean, and clearly labeled to avoid cross-contamination of materials.
- .5 Clean contaminated materials before placing in collection containers.
- .6 Product containers:
  - .1 Seal empty product containers and store safely.
  - .2 Collect, package, and temporarily store partly used or unused product containers for recycling.
- .7 Protect, stockpile, store and catalogue salvaged items.
- .8 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .9 Store oily waste in approved receptacles to maximize cleanliness and safety.
- .10 Deposit greasy or oily rags and materials subject to spontaneous combustion in purpose-built receptacles. Remove at end of each work day.
- .11 Protect structural components not removed for demolition from movement or damage.
- .12 Support affected structures. If safety of building is endangered, cease operations and immediately notify Consultant.
- .13 Protect surface drainage, storm sewers, sanitary sewers, and utility services from damage
- .14 and blockage.
- .15 Handle and dispose of hazardous materials in accordance with AHJ requirements.
- .16 Place materials defined as hazardous or toxic in designated containers.
  - .1 Storing flammable and combustible waste liquids on site is prohibited. Remove daily or more frequently as directed by the Consultant.
  - .2 Store volatile waste in covered metal containers.
  - .3 Manage unused sealants as hazardous materials.

**3.03 REMOVAL AND DISPOSAL REQUIREMENTS**

- .1 Remove waste including that caused by the Owner or other contractors.
- .2 Remove waste from the work site at regularly scheduled times.
  - .1 Remove volatile waste from site at end of each work day.
- .3 Burying waste materials on site is prohibited.
- .4 Burning waste materials on site is prohibited.
- .5 Dispose of waste off site in accordance with Ontario Regulations 102/94 and 103/94 made under the Environmental Protection Act.
  - .1 Arrange for collection by, or delivery to, appropriate recycling or reuse facilities.
    - .1 Recycle metal materials at metal recycling facilities.
  - .2 Materials designated for recycling or reuse: Transport materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to recycling process.

**3.04 SITE QUALITY CONTROL**

- .1 Not Used.

**3.05 SAMPLE CONSTRUCTION WASTE MANAGEMENT FORMS**

- .1 Not Used.

**END OF SECTION**



**1 GENERAL**

**1.01 RELATED REQUIREMENTS**

.1 N/A

**1.02 PROTECTING INSTALLED CONSTRUCTION**

- .1 Protect partially installed and completed work from damage; use methods and materials that will not stain or otherwise damage the work.
- .2 Disperse material and equipment loads; prevent overloading parts of buildings and site work.
- .3 Protect finished surfaces in accordance with manufacturer's instructions.
- .4 Remove temporary protection, remaining after installation, immediately before final cleaning.
- .5 Remedy damaged work at no change to the Contract Amount.

**2 PRODUCTS**

**2.01 NOT USED**

.1 Not used.

**3 EXECUTION**

**3.01 NOT USED**

.1 Not used.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 N/A

### **1.02 REFERENCE STANDARDS**

- .1 ULC Standards (ULC):
  - .1 CAN/ULC-S1001-11, Standard for Integrated Systems Testing of Fire Protection and Life Safety Systems
- .2 OAA-OGCA Take-Over Procedures – Document 100
  - .1 [OAA-OGCA Take-Over Procedures \(CA\) – Document 100](#)

### **1.03 ADMINISTRATIVE REQUIREMENTS**

- .1 Arrange for, conduct and document final inspections, close-out and commissioning at the completion of the Work in accordance with the procedures described in the General Conditions of the Contract, and OAA/OGCA Document 100.
- .2 Acceptance of Work Procedures:
  - .1 Contractor's inspection: Conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
    - .1 Notify the Consultant in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
    - .2 Request Consultant's review.
  - .2 Consultant's review:
    - .1 Consultant and Contractor to review Work and identify deficiencies and defects.
    - .2 Contractor to correct Work as directed.
- .3 Completion tasks: Submit written certificates in English that tasks have been performed as follows:
  - .1 Work: Completed and inspected for compliance with Contract Documents.
  - .2 Defects: Corrected.
  - .3 Deficiencies: Completed.
  - .4 Equipment and systems: Tested, adjusted, and balanced and fully operational. Required tests completed in accordance with Mechanical and Electrical Specifications
  - .5 Certificates required by Fire Commissioner and/or Utility companies: Submitted.
  - .6 Verification letter required to confirm integrated systems testing for fire protection and life safety systems has been successfully completed in accordance with CAN/ULC-S1001.

- .7 Operation of systems: Demonstrated to Owner's designated personnel.
- .8 Commissioning and Decommissioning of mechanical systems: Completed in accordance with Mechanical and Electrical Specifications and final commissioning report submitted to the Consultant.
- .9 Work: Complete and ready for final review.
- .4 Final review:
  - .1 When completion tasks are done, request final review of Work by the Consultant, and Contractor.
  - .2 When Work is incomplete according to the Owner, Consultant, and authorized agencies, complete outstanding items and request an additional review.
  - .3 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .5 Declaration of Substantial Performance of the Work (referenced interchangeably as Substantial Performance):
  - .1 When the Owner and Consultant considers deficiencies and defects corrected and it appears requirements of Contract substantially performed, make application for Certificate of Substantial Performance of the Work.
  - .2 Comply with all requirements under the Construction Act.
  - .3 In addition to the requirements of OAA/OGCA Document 100, the following items shall accompany the Contractor's application for Substantial Performance of the Work. These items must be complete in all respects, and all verification certificates and reports having been submitted and approved by the Consultants:
    - .1 Completed Maintenance Manuals for all disciplines (No. of copies as specified),
    - .2 As-Built Drawings for all disciplines (No. of copies as specified),
    - .3 Mechanical, Sprinkler, and Electrical as-built CAD drawings,
    - .4 Occupancy Permit (where required by Municipality) and permit closeout,
    - .5 Air Balance Report (legible technicians worksheets are acceptable),
    - .6 Plumbing Inspection,
    - .7 Domestic Water Quality Test Report,
    - .8 Sprinkler dry test verification letter stamped and signed by sprinkler design Engineer,
    - .9 Mechanical start-up reports (Boilers, HVAC Units, Chillers, Water Softeners, etc.),
    - .10 Fire Alarm verification (include legible technicians worksheets),
    - .11 Emergency Lighting verification,
    - .12 ESA Certificate, and
    - .13 Systems operations have been demonstrated to Owner's personnel.

- .14 All other documents required based on the Owner's requirements outlined in the Invitation to Tender (ITT) and supporting documents.
- .6 Consultant's Inspection:
  - .1 The Consultants shall perform an inspection of the Work to assess the validity of the Contractors application, and shall identify in separate lists, unfinished work and deficiencies. Contractor shall correct work accordingly.
- .7 Certificate of Substantial Performance of the Work:
  - .1 Should the Consultant concur with the Contractor's application for Substantial Performance of the Work, the Consultant shall notify the Contractor of approval of the application for Substantial Performance of the Work and issue a Certificate of Substantial Performance of the Work.
  - .2 The Contractor shall publish a copy of the Certificate of Substantial Performance of the Work in a construction trade newspaper and shall provide the Consultant with proof of the date of publication.
- .8 Commencement of lien and warranty periods:
  - .1 The date of Owner's acceptance of submitted declaration of Substantial Performance of the Work will be the date for commencement of warranty period and commencement of lien period, unless otherwise required by the lien statute at the Place of the Work.
- .9 Final payment:
  - .1 When the Consultant considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
  - .2 When the Work is deemed incomplete by the Consultant, complete outstanding items and request an additional review.
- .10 Submission and Certification for Payment of holdback:
  - .1 After issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with the contractual agreement.
  - .2 The Consultant shall prepare the Certificate for Payment for release of basic holdback, and promptly upon receipt of the necessary documentation, issue the Certificate for Payment to the Owner.

## **2 PRODUCTS**

### **2.01 NOT USED**

- .1 Not used.

## **3 EXECUTION**

### **3.01 NOT USED**

- .1 Not used.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 01 31 19 - Project Meetings
- .2 Section 01 33 00 - Submittal Procedures
- .3 Section 01 45 00 – Quality Control
- .4 Section 01 77 00 – Closeout Procedures
- .5 Section 01 79 00 - Demonstration and Training

### **1.02 REFERENCE STANDARDS**

- .1 Not Used.

### **1.03 ADMINISTRATIVE REQUIREMENTS**

- .1 Not Used.

### **1.04 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .3 Copy will be returned after final inspection with Consultant's comments.
- .4 Revise content of documents as required prior to final submittal.
- .5 Two (2) weeks before Substantial Performance of the Work, submit to the Consultant, one (1) final copy of operating and maintenance manuals in English.
- .6 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in
- .7 Work Provide evidence, if requested, for type, source and quality of products supplied.
- .8 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .9 Pay costs of transportation.

### **1.05 FORMAT**

- .1 Prior to Substantial Performance of Work, Submit Maintenance Manuals and As-built Drawings in a Project Manual in accordance with the requirements of the Owner
- .2 Organize Project Manual data in digital format, unless otherwise specified by Owner.
  - .1 Identify contents of Project Manual in Table of Contents.
  - .2 Arrange information by Section numbers and sequence of Table of Contents.
  - .3 Provide tabs for each separate product and system, with typed description of product and major component parts of equipment.
  - .4 Include manufacturer's printed data.

- .5 Provide As-Built Drawings and Specifications in digital format, unless otherwise specified by Owner.
  - .1 Provide Drawings and Specifications in .pdf format.
  - .2 Provide scaled CAD files in .dwg format.

#### **1.06 CONTENTS - PROJECT RECORD DOCUMENTS**

- .1 Table of Contents: provide:
  - .1 Title of project.
  - .2 Date of submission.
  - .3 Names, addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
  - .4 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
  - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data:
  - .1 Mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.
- .4 Drawings:
  - .1 Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Training: Refer to Section 01 79 00 - Demonstration and Training.

#### **1.07 AS-BUILT DOCUMENTS AND SAMPLES**

- .1 Maintain, in addition to requirements in General Conditions, at site for Consultant and Owner one record copy of:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Change Orders and other modifications to Contract.
  - .5 Reviewed shop drawings, product data, and samples.
  - .6 Site test records.
  - .7 Inspection certificates.
  - .8 Manufacturer's certificates.
- .2 Store record documents and samples in site office apart from documents used for construction.
  - .1 Provide files, racks, and secure storage.

- .3 Label record documents and file in accordance with Section number listings in List of Contents of Project Manual.
  - .1 Label each document "AS-BUILT DOCUMENTS" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
  - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Consultant.

#### **1.08 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS**

- .1 Record information on set of line opaque drawings, and in copy of Project Manual, provided by Consultant.
- .2 Use colours to annotate drawings, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress.
  - .1 Do not conceal Work until required information is recorded.
  - .2 Employ a competent computer drafts person to indicate changes on the electronic set of record drawings. Provide updated Record Drawings in .dwg and .pdf.
  - .3 Mark revised documents as RECORD DOCUMENTS. Include all revisions, with special emphasis on structural steel, electrical, reinforced concrete, mechanical.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
  - .1 Measured depths of elements of foundation in relation to finish first floor datum.
  - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .4 Site changes of dimension and detail.
  - .5 Changes made by change orders.
  - .6 Details not on original Contract Drawings.
  - .7 Referenced Standards to related shop drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including:
  - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
  - .2 Changes made by Addenda and change orders.
- .6 Other Documents: Maintain manufacturer's certifications, inspection certifications, site test records, required by individual specifications Sections.
- .7 Provide digital photos, if requested, for site records.

#### **1.09 FINAL SURVEY**

- .1 Not Used.

## 1.10 EQUIPMENT AND SYSTEMS

- .1 For each item of equipment and each system include description of unit or system, and component parts.
  - .1 Give function, normal operation characteristics and limiting conditions.
  - .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.
  - .1 Include regulation, control, stopping, shut-down, and emergency instructions.
  - .2 Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's 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 test and balancing reports as specified in Section 01 45 00 - Quality Control and Mechanical and Electrical Specifications.
- .15 Additional requirements: As specified in individual specification Sections.

## 1.11 MATERIALS AND FINISHES

- .1 Building products, applied materials, and finishes: Include product data, with catalogue number, size, composition, and colour and texture designations.
  - .1 Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection products: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.



- .4 Additional requirements: As specified in individual specifications Sections.

#### **1.12 MAINTENANCE MATERIALS**

- .1 Spare Parts:
  - .1 Provide spare parts, in quantities specified in individual specification Sections.
  - .2 Provide items of same manufacture and quality as items in Work.
  - .3 Deliver to location as directed; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Consultant.
    - .2 Include approved listings in Maintenance Manual.
  - .5 Obtain receipt for delivered products and submit before Substantial Performance of the Work.
- .2 Extra Stock Materials:
  - .1 Provide maintenance and extra materials, in quantities specified in individual specification Sections.
  - .2 Provide items of same manufacture and quality as items in Work.
  - .3 Deliver to location as directed; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Consultant.
    - .2 Include approved listings in Maintenance Manual.
  - .5 Obtain receipt for delivered products and submit before Substantial Performance of the Work.
- .3 Special Tools:
  - .1 Provide special tools, in quantities specified in individual specification Section.
  - .2 Provide items with tags identifying their associated function and equipment.
  - .3 Deliver to location as directed; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Consultant.
    - .2 Include approved listings in Maintenance Manual.

#### **1.13 DELIVERY, STORAGE, AND HANDLING**

- .1 Spare parts, maintenance materials and special tools provided shall be new, not damaged or defective, and of the same quality and manufacture as products provided in the Work.
- .2 If requested, furnish evidence as to type, source and quality of Products provided.
- .3 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

- .4 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .5 Deliver all materials required as maintenance materials, spare parts or special tools, to the site, include shipping costs, and store as directed.
- .6 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .7 Store components subject to damage from weather in weatherproof enclosures.
- .8 Store paints and freezable materials in a heated and ventilated room.
- .9 Remove and replace damaged products at own expense and for review by Consultant.

#### **1.14 WARRANTIES AND BONDS**

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan to Consultant approval.
- .3 Warranty management plan to include required actions and documents to assure that Consultant receives warranties to which it is entitled.
- .4 Submit, warranty information made available during construction phase, to Consultant for approval before each monthly pay estimate.
- .5 Assemble approved information in Project Manual, submit upon acceptance of work and organize as follows:
  - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
  - .2 List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
  - .3 Obtain warranties and bonds, executed in duplicate by Subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
  - .4 Verify that documents are in proper form, contain full information, and are notarized.
  - .5 Co-execute submittals when required.
  - .6 Retain warranties and bonds until time specified for submittal.
- .6 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .7 Conduct joint one (1) year warranty inspection, measured from time of acceptance, by Consultant.
- .8 Include information contained in warranty management plan as follows:
  - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, Subcontractors, manufacturers, or suppliers involved.
  - .2 Provide list for each warranted equipment, item, feature of construction or system indicating:
    - .1 Name of item.
    - .2 Model and serial numbers.

- .3 Location where installed.
- .4 Name and phone numbers of manufacturers or suppliers.
- .5 Names, addresses and telephone numbers of sources of spare parts.
- .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
- .7 Cross-reference to warranty certificates as applicable.
- .8 Starting point and duration of warranty period.
- .9 Summary of maintenance procedures required to continue warranty in force.
- .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
- .11 Organization, names and phone numbers of persons to call for warranty service.
- .12 Typical response time and repair time expected for various warranted equipment.
- .3 Contractor's plans for attendance at one (1) year post-construction warranty inspections.
- .4 Procedure and status of tagging of equipment covered by extended warranties.
- .5 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .9 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .10 Written verification to follow oral instructions.
  - .1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

#### **1.15 WARRANTY TAGS**

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

**2 PRODUCTS**

**2.01 NOT USED**

.1 Not Used.

**3 EXECUTION**

**3.01 NOT USED**

.1 Not Used.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 N/A

### **1.02 ADMINISTRATIVE REQUIREMENTS**

- .1 Demonstrate scheduled operation and maintenance of equipment and systems to Owner's personnel two (2) weeks before date of final inspection or substantial performance, whichever is earlier.
  - .1 Contractor to coordinate individual training sessions for all items required below in this Section and outlined in the mechanical and electrical Contract Documents. Training sessions are allowed to take place one after another as long as time allows and information is not missed due to a time shortage.
- .2 Owner: Provide list of personnel to receive instructions, and coordinate their attendance at agreed-upon times.
- .3 Preparation:
  - .1 Verify conditions for demonstration and instructions comply with requirements.
  - .2 Verify designated personnel are present.
  - .3 Ensure equipment has been inspected and put into operation in accordance with mechanical drawings and manufacturer's requirements.
  - .4 Ensure testing, adjusting, and balancing has been performed in accordance with Section 01 91 13 - General Commissioning Requirements and equipment and systems are fully operational.
  - .5 Ensure all related systems are fully functional, connected, and operating properly.
- .4 Demonstration and Instructions:
  - .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at scheduled and agreed upon times, at the equipment location. Training must take place in-person. Virtual training is not acceptable.
  - .2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.
  - .3 Review contents of manual in detail to explain aspects of operation and maintenance.
  - .4 Prepare and insert additional data in operations and maintenance manuals when needed during instructions.
    - .1 Prepare final instructions after meeting in digital format for records. Distribute to all Consultants, Owner and Owner's representatives that participated in the training.
- .5 Time Allocated for Instructions: ensure amount of time required for instruction of each item of equipment or system as follows:
  - .1 Heating, Cooling and Ventilation System: two (2) hours of instruction.

- .2 BAS Control System: two (2) hours of instruction.
- .3 Plumbing System: one (1) hour of instruction.
- .4 Fire Suppression System: one (1) hour of instruction.
- .5 Fire Alarm System: one (1) hour of instruction.
- .6 Electrical System: two (2) hours of instruction.

### **1.03 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit proposed schedule of time(s) and date(s) for in-person, on-site demonstration of each item of equipment and each system two (2) weeks before designated dates, for Owner's and Consultant's approval.
  - .1 Revise schedule as needed based on Owner and Consultant feedback when necessary.
- .3 Submit digital, pdf, signed reports within one (1) week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.
  - .1 Give time and date of each demonstration, with list of persons present.
- .4 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

### **1.04 QUALITY ASSURANCE**

- .1 When specified in individual Sections requiring manufacturer to provide authorized representative to demonstrate operation of equipment and systems:
  - .1 Instruct Owner's personnel.
  - .2 Submit digital, pdf, signed report that demonstration and instructions have been completed.

## **2 PRODUCTS**

### **2.01 NOT USED**

- .1 Not Used.

## **3 EXECUTION**

### **3.01 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **1 GENERAL**

### **1.01 SUMMARY**

- .1 This Section includes general requirements relating to commissioning (Cx) of project components and systems, specifying general requirements for performance verification (PV) of components, equipment, sub-systems, systems, and integrated systems.

### **1.02 RELATED REQUIREMENTS**

- .1 N/A

### **1.03 ABBREVIATIONS**

- .1 BAS: Building Automation System
- .2 BMM: Building Management Manual
- .3 Cx: Commissioning
- .4 EMCS: Energy Monitoring and Control Systems
- .5 O&M: Operation and Maintenance
- .6 PI: Product Information
- .7 PV: Performance Verification
- .8 TAB: Testing, Adjusting and Balancing

### **1.04 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination:
  - .1 Owner's assigned representatives and Consultants will observe some or all commissioning activities at their discretion.
  - .2 Owner's Performance Testing: Performance testing of equipment or systems by Owner's representative will not relieve Contractor from compliance with specified start-up and testing procedures.
  - .3 Cooperate fully with Owner's representatives and Consultant during stages of acceptance and occupancy of facility.
    - .1 Contractor and related Subtrades to participate in commissioning by Owner's own forces.
    - .2 Owner's own forces commissioning to take place after completion of Contractor required TAB and Cx of all related systems, and after receipt of Closeout Documents.
    - .3 Owner's own forces commissioning is meant as a fine tuning of the system and does not alleviate the Contractor from any commissioning activities outlined elsewhere in these Contract Documents.

- .4 Coordination with Authorities Having Jurisdiction (AHJ):
  - .1 Where specified start-up, testing or commissioning procedures duplicate verification requirements of AHJ, arrange for authority to witness procedures to avoid duplication of tests and to facilitate an earlier acceptance of facility.
  - .2 Obtain certificates of approval, acceptance, and compliance with rules and regulations of AHJ.
  - .3 Submit copies to Owner and Consultant within five (5) days of test and with Cx report.
- .2 Commissioning Meetings:
  - .1 Hold Cx meetings after project meetings in accordance with Section 01 32 16.16 - Construction Progress Schedule and as indicated in this Section, unless agreed upon with Owner and Consultant in writing.
  - .2 Use Cx meetings to resolve issues, monitor progress, and identify defects and deficiencies relating to Cx.
  - .3 Continue Cx meetings on a regular basis, including during equipment start-up period, and functional testing period until commissioning deliverables have been addressed.
  - .4 At 60% construction completion stage: Departmental Representative and Consultant will request a separate Cx scope meeting to review progress, discuss schedule of equipment start-up activities and prepare for Cx. Agenda topics include the following:
    - .1 Review duties and responsibilities of Contractor and Subcontractors, addressing delays and potential problems.
    - .2 Determine the degree of involvement of Subcontractors and manufacturer's representatives in the Cx process.
  - .5 Meetings will be chaired by Cx Agent, who will record and distribute minutes.
  - .6 Ensure Subcontractors and relevant manufacturer representatives are present at 60% construction completion stage, at subsequent Cx meetings, and when otherwise required.
- .3 Observation of Starting and Testing:
  - .1 Give fourteen (14) days notice before beginning commissioning.
  - .2 Owner's representative and Consultant may choose to observe start-up and testing.
  - .3 Cx Agent to be present at tests performed and documented by Subcontractors, suppliers, and equipment manufacturers.
  - .4 Subcontractors, suppliers, and equipment manufacturers shall be present at Owner's third party commissioning as may be needed to resolve issues, answer questions, etc.
- .4 Conflicts:
  - .1 Report conflicts between requirements of this Section and other Sections to Consultant and obtain interpretation or clarification before starting commissioning work.



- .2 Failure to report conflicts and obtain interpretation or clarification will result in application of the more stringent requirement.
- .5 Excess Contract Administration:
  - .1 Where testing, inspection, or verification of Work is required and the verification is not accepted by the Consultant, the Contractor shall bear the cost of re-verification where:
    - .1 The initial verification demonstrates that the Work does not comply with the Contract Documents;
    - .2 A subsequent re-verification again demonstrates non-compliance; or
    - .3 The Contractor requests additional verification prior to completion of corrective work required to address previously identified deficiencies.
  - .2 Where repeated verifications are required due to non-compliant Work or premature requests by the Contractor, the Owner may recover from the Contractor the reasonable costs incurred by the Consultant for such additional contract administration services.
  - .3 The cost of the Consultant's excess contract administration will be based on a rate of \$ 200.00 per hour, subject to increase yearly, as of January 1st.

#### **1.05 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Submit no later than four (4) weeks after award of Contract:
    - .1 name of Cx agent,
    - .2 draft Cx documentation, and
    - .3 preliminary Cx schedule.
  - .2 Request changes to submittals in writing to Consultant and obtain written acceptance or rejection at least eight (8) weeks before start of Cx.
  - .3 Where Cx procedures are not specified, submit proposed ones to Owner's representative and Consultant and obtain written acceptance or rejection at least eight (8) weeks before start of Cx.
  - .4 Submit additional documentation relating to Cx process as required by Owner's representatives and Consultant.
  - .5 If instruments installed in Contract will be used for Cx of TAB and PV, then submit TAB and PV instrument calibration certificates for review and acceptance.
  - .6 Submit EMCS and BAS sensor calibration certificates.
  - .7 Submit BAS controls new graphics layout, and product data on all components of the system.
- .2 Commissioning Schedule:
  - .1 Create and submit detailed Cx schedule as part of construction schedule in accordance with Section 01 32 16.16 - Construction Progress Schedule.

- .2 Allow in the schedule adequate time for Cx activities prescribed in technical specification Sections and commissioning Sections including:
  - .1 acceptance of Cx reports
  - .2 verification of reported results
  - .3 repairs, retesting, re-commissioning, and re-verification
  - .4 training
  - .5 EMRS and BAS integration graphics check
- .3 Start-Up Documentation:
  - .1 Assemble start-up documentation and submit to Owner's representative and Consultant for review and acceptance before beginning commissioning.
  - .2 Start-up documentation to include:
    - .1 Factory and on-site test certificates for specified equipment.
    - .2 Pre-start-up inspection reports.
    - .3 Signed installation/start-up checklists.
    - .4 Start-up reports.
    - .5 Step-by-step description of complete start-up procedures so Owner's representative and/or Consultant can repeat start-up at any time.
- .4 Submit for review and acceptance:
  - .1 Complete list of proposed instruments and equipment to perform commissioning.
  - .2 List data including, serial number, current calibration certificate, calibration date, calibration expiry date and calibration accuracy.
- .5 Commissioning Documentation:
  - .1 Follow and include all information required by the Owner's building commissioning standards.
  - .2 Submit completed Cx documentation to Owner's representative and Consultant for review and acceptance.

#### **1.06 MAINTENANCE MATERIALS SUBMITTALS**

- .1 Supply and document maintenance materials, spare parts, and special tools as specified in other specification Sections.

#### **1.07 SITE CONDITIONS**

- .1 Where Cx of weather-dependent, occupancy-dependent, or seasonally-dependent equipment or systems cannot be conducted under near-rated or near-design conditions, extrapolate part-load results to design conditions if acceptable to Owner's representative and Consultant with manufacturer's assistance in accordance with equipment manufacturer's instructions, data, and approved formulae.

## **2 PRODUCTS**

### **2.01 NOT USED**

- .1 Not used.

## **3 EXECUTION**

### **3.01 GENERAL**

- .1 Cx is a planned program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. Perform Cx after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved.
  - .1 Objectives: Verify that installed equipment, systems and integrated systems operate in accordance with Contract Documents and design criteria and intent.
  - .2 Ensure appropriate documentation is compiled into the BMM.
  - .3 Effectively train O&M staff.
- .2 Contractor shall assist in Cx process, operating equipment and systems, troubleshooting, and making adjustments as required.
  - .1 Operate systems at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems should interact with each other as intended in accordance with Contract Documents and design criteria.
  - .2 Make adjustments as needed, during these checks, to enhance performance and meet environmental or user requirements.
- .3 Design Criteria: In accordance with Owner's requirements or as determined by Consultant. To meet Project functional and operational requirements.

### **3.02 COMMISSIONING OVERVIEW**

- .1 Include Cx as a line item in Contractor's cost breakdown.
- .2 Cx activities supplement the site quality control and testing procedures described in relevant technical specification Sections.
- .3 Conduct Cx at the same time as other activities during the construction stage.
- .4 Cx identifies issues in the Design stages, which are addressed during Construction and Cx stages. This step ensures the built facility meets functional and operational requirements while operating as intended under weather, environmental and occupancy conditions. Cx activities include the transfer of critical knowledge to the Owner's facility operations personnel.
- .5 Departmental Representative and Consultant will issue Interim Acceptance Certificate only after:
  - .1 Cx documentation has been received, reviewed for suitability, and reviewed and accepted by Departmental Representative and Consultant,
  - .2 equipment, components and systems have been commissioned, and
  - .3 O&M training has been completed.

### **3.03 PRE-COMMISSIONING REVIEW**

- .1 Before Construction:
  - .1 Review Contract Documents and confirm in writing to Consultant the following:
    - .1 Adequacy of provisions for Cx.
    - .2 Aspects of design and installation pertinent to success of Cx.
- .2 During Construction:
  - .1 Coordinate provision, location, and installation of provisions for Cx.
- .3 Before Beginning Cx:
  - .1 Verify Cx Plan and schedules are up-to-date.
  - .2 Verify installation of related components, equipment, systems, and sub-systems are complete.
  - .3 Review Cx requirements and procedures.
  - .4 Verify documentation used for the Cx process is shelf-ready (bound, organized, indexed, etc.).
  - .5 Review design criteria and intent, and special features to ensure full understanding.
  - .6 Submit complete start-up documentation to Owner's representative and Consultant.
  - .7 Verify systems have been cleaned thoroughly.
  - .8 Complete TAB procedures on systems and submit TAB reports to Owner's representative, Consultant and AHJ for review and acceptance.
  - .9 Verify "As-Built" system schematics are available.
- .4 Inform Owner's representative and Consultant in writing of defects and deficiencies in installed Work.

### **3.04 STARTING AND TESTING**

- .1 Contractor to provide and pay costs of the following:
  - .1 inspections, including disassembly and re-assembly after approval, and for starting, testing, adjusting, and;
  - .2 temporary testing equipment.

### **3.05 PERFORMANCE VERIFICATION TOLERANCES**

- .1 Application Tolerances:
  - .1 A specified range of acceptable deviations of measured values from specified values or specified design criteria except for special areas that shall be within +/- 10% of specified values, or as outlined in the mechanical and electrical specifications, whichever is more stringent.
- .2 Instrument Accuracy Tolerances:
  - .1 To be of higher order of magnitude than equipment or system being tested.

- .3 Measurement Tolerances During Verification:
  - .1 Unless otherwise specified, actual values shall be within +/- 2% of recorded values.

### **3.06 MANUFACTURER SERVICES**

- .1 During factory testing, manufacturer to:
  - .1 Coordinate time and location of testing.
  - .2 Arrange for Departmental Representative to observe testing.
  - .3 Submit testing documentation for review and acceptance by Departmental Representative and Consultant.
  - .4 Obtain written acceptance of test results and documentation from Departmental Representative and Consultant before delivery to site.
- .2 Obtain manufacturer's installation, start-up and operations instructions before start-up of components, equipment and systems, and review with Owner's representative and Consultant.
  - .1 Compare completed installation with manufacturer's published data, record discrepancies, and review with manufacturer.
  - .2 Modify procedures that may be detrimental to equipment performance and review with manufacturer before start-up.
- .3 Integrity of warranties:
  - .1 Use manufacturer's trained start-up personnel where specified in other divisions or where required to maintain integrity of warranty.
  - .2 Verify with manufacturer that testing as specified will not void warranties.
- .4 Qualifications of manufacturer's personnel:
  - .1 Experienced in design, installation and operation of equipment and systems.
  - .2 Ability to interpret test results accurately.
  - .3 Report results in clear, concise, logical manner.

### **3.07 COMMISSIONING PROCEDURES**

- .1 Verify that equipment and systems are complete, clean, and operating in a normal and safe manner before conducting start-up, testing and Cx.
- .2 Conduct start-up and testing in the following distinct phases:
  - .1 Included in delivery and installation:
    - .1 Verification of conformity to specification, reviewed and accepted shop drawings and completion of PI report forms.
    - .2 Visual inspection of quality of installation.
  - .2 Start-up: Follow accepted start-up procedures.
  - .3 Operational testing: Document equipment performance.
  - .4 System PV: Include repetition of tests after correcting deficiencies.
  - .5 Post-Substantial Performance Verification: To include fine-tuning.

- .1 Participate in Post-Substantial Performance Verification by Owner's own forces.
- .3 Correct deficiencies and obtain acceptance from Owner's representative and Consultant after distinct phases have been completed and before beginning the next phase.
- .4 Document required tests on approved PV forms.
- .5 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Owner's representative and Consultant. If evaluation report indicates that equipment start-up procedure was deficient and resulted in equipment damage, perform the following:
  - .1 Minor equipment/systems: Perform corrective measures acceptable to Owner's representative and Consultant.
  - .2 Major equipment/systems: If evaluation report indicates that equipment damage is minor, perform corrective measures acceptable to Owner's representative and Consultant.
  - .3 If evaluation report indicates that major equipment damage has occurred, Owner's representative and/or Consultant will reject equipment.
    - .1 Remove rejected equipment from site and replace with new equipment.
    - .2 Perform specified start-up procedures on new equipment/systems.

### **3.08 OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS**

- .1 After start-up, operate and maintain equipment and systems as directed or recommended by equipment/system manufacturer.
- .2 With manufacturer's assistance, develop written maintenance program and submit to Owner's representative and Consultant for review and acceptance before implementation.
- .3 Operate and maintain systems for length of time required for commissioning to be completed.
- .4 After completion of commissioning, operate and maintain systems until issuance of certificate of interim acceptance.

### **3.09 TEST RESULTS**

- .1 If start-up, testing, or PV produce unacceptable results, repair, replace or repeat specified starting or PV procedures until acceptable results are achieved.
- .2 Provide labour and materials, and assume costs for re-commissioning.

### **3.10 START OF COMMISSIONING**

- .1 Notify Owner's representative and Consultant at least fourteen (14) days before start of Cx.
- .2 Start Cx after elements of building affecting start-up and performance verification of systems have been completed.

### **3.11 TEMPORARY INSTRUMENTS AND EQUIPMENT**

- .1 Provide the following instruments and equipment as required:
  - .1 2-way radios
  - .2 ladders
  - .3 other instruments and equipment required to complete commissioning

### **3.12 COMMISSIONING PERFORMANCE VERIFICATION**

- .1 Carry out Cx:
  - .1 under actual (or accepted simulated if actual not feasible) operating conditions, over entire operating range, and in all modes, and
  - .2 on independent systems and interacting systems.
- .2 Cx procedures to be repeatable and reported results are to be verifiable.
- .3 Follow equipment manufacturer's operating instructions.
- .4 Make EMCS and BAS trending information available as supporting documentation for performance verification.

### **3.13 EXTENT OF VERIFICATION**

- .1 Provide labour and instrumentation to verify up to 30% of reported results, unless otherwise specified in other specification Sections.
- .2 Number and location to be at discretion of Owner's representative and Consultant.
- .3 Conduct tests repeated during verification under same conditions as original tests, using same test equipment, and instrumentation.
- .4 Review and repeat commissioning of systems if inconsistencies found in more than 20% of reported results.
- .5 Perform additional commissioning until results are acceptable to Owner's representative and Consultant.

### **3.14 INSTALLED INSTRUMENTATION**

- .1 Use instruments installed under Contract for TAB and PV if:
  - .1 Accuracy complies with this specification Section.
  - .2 Calibration certificates have been submitted to Owner's representative and Consultant.
- .2 Calibrated EMCS and BAS sensors may be used to obtain performance data if sensor calibration has been completed and accepted.

### **3.15 PROCEDURES FOR DEFICIENCIES DISCOVERED DURING COMMISSIONING**

- .1 Correct defects and deficiencies found during the Cx process. Re-verify equipment and components within the defective or deficient system to verify proper performance, including related systems if requested by Owner's representative or Consultant.

- .2 Costs associated with re-commissioning defective and deficient work is the responsibility of Contractor. Above costs to be in the form of progress payment reductions or hold-back assessments.

### **3.16 COMMISSIONING CONSTRAINTS**

- .1 Since access into areas will be difficult after occupancy it is necessary to complete Cx of occupancy, weather, and seasonal sensitive equipment and systems before issuance of the Interim Certificate, using, if necessary, simulated thermal loads.

### **3.17 MISCELLANEOUS CHECKS AND ADJUSTING**

- .1 Make adjustments and changes which become apparent as Cx proceeds.
- .2 Perform static and operational checks as applicable and as required.

### **3.18 DEFICIENCIES AND DEFECTS**

- .1 Correct deficiencies and defects found during start-up and Cx to satisfaction of Owner's representative and Consultant.
- .2 Report concerns, deficiencies, and defects affecting Cx to Owner's representative and Consultant in writing. Stop Cx until problems are rectified.

### **3.19 CLOSEOUT ACTIVITIES**

- .1 Completion of Commissioning:
  - .1 Upon completion of Cx, leave systems in normal operating mode.
  - .2 Except for warranty and seasonal verification activities specified in Cx specifications, complete Cx before issuance of Interim Certificate of Completion.
  - .3 Cx to be considered complete when contract Cx deliverables have been submitted and accepted by Owner's representative and Consultant.
- .2 Activities Upon Completion of Commissioning:
  - .1 When changes are made to baseline components or system settings established during Cx process, provide updated Cx form for affected item.
- .3 Training:
  - .1 In accordance with Section 01 79 00.13 - Demonstration and Training for Building Commissioning.

**END OF SECTION**



## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section N/A

### **1.02 REFERENCE STANDARDS**

- .1 ASTM International (ASTM):
  - .1 ASTM E631-15, Standard Terminology of Building Constructions
  - .2 ASTM E2018-15, Standard Guide for Property Condition Assessments: Baseline Property Condition Assessment Process

### **1.03 SECTION INCLUDES**

- .1 This Section clarifies Contractor's responsibilities and obligations to review the information provided in the Site specific "Existing Building Conditions Assessment (BCA)" report pertaining to existing on Site building located at 70 Collier Street, Barrie, Ontario, L4M 4T5.

### **1.04 ADMINISTRATIVE REQUIREMENTS**

- .1 Arrange for a pre-construction meeting in accordance with Section 01 31 19 - Project Meetings. Meeting to be attended by Owner, Consultant, Contractor, and affected Subcontractor (s) to discuss project's requirements before Work starts.
- .2 Conduct a site visit with Owner and Consultant to examine existing Site conditions before Work starts.

### **1.05 RESPONSIBILITY**

- .1 Contractor shall be responsible for reading and evaluating the information provided in the Site specific Building Condition Assessment (BCA) report(s) and Hazard Material Report(s) as they are pertinent to the scope of work of this Project under this Contract when made available by the Owner.
- .2 Contractor shall request any reports for typical maintenance programs, history of past repairs, renovations, and major building component replacements, repair program pertinent to on Site building.
- .3 Contractor shall review reports, plans, operational manuals, safety plans, fire safety plans pertinent to on Site building(s) to evaluate building components identified in the Site specific BCA.
- .4 Contractor shall ask Consultant should they have any questions related to the Site specific BCA.
- .5 Contractor shall notify Consultant should they notice any inconsistencies and/or variances between the Site specific BCA and the Project's drawings and/or specifications in accordance with ASTM E2018 requirements.
- .6 Contractor shall incorporate any recommendations in the Site specific BCA as they pertain to the health and safety of workers on Site, in accordance with Section 01 35 29 - Health, Safety, and Emergency Response Procedures.

- .7 Contractor shall exercise every reasonable precaution for the protection of each worker on Site.
- .8 Contractor shall furnish the Site specific BCA to all subcontractors who will be performing work on Site.

#### **1.06 REGULATORY REQUIREMENTS**

- .1 Refer to laws, by laws, ordinances, rules, regulations, and orders of authority having jurisdictions, and other legally enforceable requirements applicable to Work at that area; or become in force during performance or work.

#### **1.07 QUALIFICATIONS**

- .1 Only qualified professionals with a minimum of five (5) years experience and well-rounded knowledge of building systems and applicable building codes are to review the Site specific BCA and to verify the current Site conditions.
- .2 Provide proof of qualifications when requested by Consultant.

#### **1.08 SITE INFORMATION**

- .1 Site located at 70 Collier Street, Barrie, Ontario, L4M 4T5, features one (1) existing building, currently occupied by the City of Barrie.

#### **1.09 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit Site specific Health and Safety Plan, within seven (7) days after date of Notice to proceed and before mobilization to Site. List any relevant hazards present on Site and need to be included in the Contractor's Site specific Health and Safety plan as required by authority having jurisdiction.
  - .1 Prepare Site specific Health and Safety Plan in accordance with Section 01 35 29 - Health, Safety, and Emergency Response Procedures, refer to any findings of Site specific Designated Substance Reports (DSR), overhead protection and hoarding requirements, roof anchorage testing reports, building fire evacuation plans.

### **2 PRODUCTS**

#### **2.01 NOT USED**

- .1 Not Used.

### **3 EXECUTION**

#### **3.01 EXAMINATION**

- .1 Conduct a site visit to examine existing site conditions in accordance with Section 01 71 00 - Examination and Preparation.
- .2 Before Work starts verify existing Site and building conditions. Notify Consultant should any variations from the Site specific BCA report were noticed.

### 3.02 VERIFICATION OF CONDITIONS

- .1 Identify and confirm any discrepancies or missing information in the Site specific BCA with Consultant.
- .2 Assess any on-Site unknown conditions observed through Site walk-through and discuss with Consultant should any extra work be required beyond the Contract scope of work.
- .3 Notify Consultant should any extra work beyond the scope of work under this Contract be required, due to hidden and unknown conditions observed upon Contractor Site observation.
  - .1 Do not proceed with any extra work without obtaining Consultant written approval.
- .4 Contractor to verify and compare the current conditions of each of the following Site components:
  - .1 Current Site conditions, including: driveways, parking lots (including: curbs and gutters), sidewalks, fencing, handrails, exterior stairs, retaining walls, planting and landscaping.
  - .2 Building Structure: foundation walls, columns, shear walls, floor slabs, parapets, floor slabs.
  - .3 Building Interior: walls, floors, ceilings, equipment, stairs and handrails, painting.
  - .4 Elevators: cabs, hoisting equipment, controllers.
  - .5 Electrical Systems: distribution panels, transformers, emergency generator(s), door systems, fans.
  - .6 Lighting Systems: emergency lighting, exterior lighting system.
  - .7 Communication Systems: voice communication.
  - .8 Security Systems: cameras, Closed Circuit Television (CCTV).
  - .9 Mechanical Systems: heating and cooling, ventilation, exhaust, air-conditioning.
  - .10 Plumbing Systems: plumbing fixtures, domestic water supply and distribution, sanitary waste sewer, stormwater sewer, roof drains, sump pumps.
  - .11 Fire Protection Systems: fire alarm, fire pump, sprinklers.

### 3.03 PROTECTION OF IN-PLACE CONDITIONS

- .1 Provide in-place protection should the current verified Site conditions be considered unsafe in accordance with the requirements of the Site specific Health and Safety Plan, and to protect on-Site personnel and ensure Site safety during all times of work execution.
- .2 Handle, store and dispose flammable materials on site in a safe manner in accordance with NFC (2015) requirements
- .3 Notify Consultant of any identified potential risks due to onsite obstacles.
  - .1 Do not remove any obstacles before obtaining Consultant written approval.

**END OF SECTION**

## **1 GENERAL**

### **1.01 SUMMARY**

- .1 Section includes:
  - .1 demolition and removal of selected portions of interior building components and finishes; and
  - .2 repair procedures for selective demolition operations.
- .2 Section does not include:
  - .1 removal of hazardous materials or asbestos abatement; and
  - .2 mechanical or electrical equipment, except as required to make minor modifications to allow the work to be completed.

### **1.02 RELATED REQUIREMENTS**

- .1 Section 02 22 10 – Existing Building Condition Assessments
- .2 Section 07 84 00 – Firestopping
- .3 Section 09 30 13 – Ceramic Tiling
- .4 Section 09 65 19 – Resilient Tile Flooring
- .5 Section 09 68 13 – Tile Carpeting
- .6 Section 09 21 16 - Gypsum Board Assemblies

### **1.03 DEFINITIONS**

- .1 Demolish: Detach items from existing construction and legally dispose of them off site, unless indicated to be removed and salvaged or removed and reinstalled.
- .2 Hazardous material: Controlled product and a chemical, biological, or physical agent that, by reason of a property that the agent possesses, is hazardous to the safety or health of a person exposed to it. Synonymous with the definition of hazardous substance in the Canada Labour Code.

### **1.04 REFERENCE STANDARDS**

- .1 ASTM International (ASTM):
  - .1 ASTM C475/C475M-17, Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board
- .2 CSA Group (CSA):
  - .1 CSA S350-M1980, Code of Practice for Safety in Demolition of Structures
  - .2 CSA Z783:12, Deconstruction of buildings and their related parts

**1.05 ADMINISTRATIVE REQUIREMENTS**

- .1 Not Used.

**1.06 ACTION AND INFORMATION SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Site quality control submittals:
  - .1 Pre-demolition photographs or video recordings as specified in EXAMINATION in this section.
  - .2 Report indicating results of inspections specified in SITE QUALITY CONTROL in this section.
- .3 Special procedure submittals:
  - .1 Schedule of selective interior demolition activities: In accordance with Section 01 32 16.16 - Construction Progress Schedule - Critical Path Method (CPM).
    - .1 Indicate, at minimum:
      - .1 detailed sequence of selective interior demolition and removal work
      - .2 utility service interruptions
      - .3 access requirements to floors other than fourth floor.
- .4 Submit copies of the following, when required by the authority having jurisdiction (AHJ):
  - .1 reviewed shop drawings; and
  - .2 reviewed demolition procedures.

**1.07 SITE CONDITIONS**

- .1 Hazardous materials are expected at the Place of the Work.
  - .1 Review the hazardous materials assessment in accordance with Section 02 22 10 – Existing Building Condition Assessments and Owner provided documentation.
- .2 Stop work immediately and take preventative measures if hazardous materials are encountered.
  - .1 Notify the Owner's representative and Consultant immediately.
  - .2 Proceed with work after receipt of written instructions from the Owner's representative or Consultant.
- .3 The Owner and Consultant assume no responsibility for condition of areas to be selectively demolished:
  - .1 Conditions existing at time of bidders briefing will be maintained as far as practical.
  - .2 The Owner will remove the following items prior to selective interior demolition:
    - .1 IT Rack
    - .2 Printers
    - .3 Non-fixed furniture

## **2 PRODUCTS**

### **2.01 REPAIR MATERIALS**

- .1 Floor patching and levelling compounds: Cementitious, trowel-ready, self-levelling compounds compatible with specified floor finishes.
  - .1 Gypsum based products are not acceptable.
  - .2 Co-ordinate with Section 09 30 13 – Ceramic Tiling
  - .3 Co-ordinate with Section 09 65 19 – Resilient Tile Flooring
  - .4 Co-ordinate with Section 09 68 13 – Tile Carpeting
- .2 Concrete unit masonry: Lightweight concrete masonry units, and mortar, cut and trimmed to fit opening to be filled. Provide standard hollow core units, square end units, and bond beam units as required to match existing field conditions.
- .3 Gypsum board patching compounds: To ASTM C475/C475M, joint compound, bedding and finishing types thinned to provide skim coat consistency to patch and prepare existing gypsum board walls ready for new finishes.
  - .1 Co-ordinate with Section 09 21 16 - Gypsum Board Assemblies.

## **3 EXECUTION**

### **3.01 EXAMINATION**

- .1 Verification of conditions:
  - .1 Verify substrate and project conditions in accordance with Section 01 71 00 - Examination and Preparation, and:
    - .1 Review existing conditions and coordinate with indicated requirements to determine extent of demolition required.
    - .2 Photograph or video record existing conditions of adjoining construction and site improvements before starting selective interior demolition. Include finish surfaces that may be misconstrued as damage caused by work of this section.
    - .3 Review record documents of existing site when made available by the Owner.
      - .1 The Owner or Consultant does not guarantee record documents are accurate, complete, or appropriate.
    - .4 Inventory and record the condition of items being removed and turned over to the Owner. Promptly submit a written report to the Owner's representative and Consultant.
    - .5 Inventory and record the condition of items being removed and reinstalled.
    - .6 When unexpected structural, mechanical, electrical, or other issues are encountered that interfere with demolition or removal, investigate and measure the nature and extent of the interference.
      - .1 Promptly submit a written report to the Owner's representative and Consultant.

- .2 Include detailed description of location, including marked up floor plan, with supporting site photos and written description of the issue and recommendations to remediate the issue.
- .3 Include description of the extents of investigation that has taken place to come up with recommendations.
- .7 Verify hazardous materials have been abated or remediated before proceeding with work of this section.
- .8 Verify affected utilities have been disconnected and are ready to be capped.
- .9 Review conditions as the work progresses to detect hazards resulting from work of this section.

### 3.02 PREPARATION

- .1 Protection of in-place conditions:
  - .1 Protect in-place conditions in accordance with Section 01 56 00 - Temporary Barriers and Enclosures, and:
    - .1 Prevent movement, settlement or damage of adjacent structures, services, and parts of existing buildings indicated to remain.
    - .2 Support affected site items, and if safety of site item being demolished or adjacent services appears to be endangered, take preventative measures, stop working, and immediately notify the Owner's representative and Consultant.
    - .3 Cover and protect furniture, furnishings, and equipment that have to remain.

### 3.03 POLLUTION CONTROLS

- .1 Dust control: Provide water mist, temporary enclosures, or other suitable methods acceptable to the Owner's representative and Consultant to limit spread of dust and dirt.
  - .1 Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
  - .2 Wet mop floors to eliminate tracking of dirt, wipe down walls and doors of demolition enclosure. Vacuum carpeted areas.
- .2 Remove and handle debris to prevent spillage on adjacent surfaces and areas.
- .3 Prevent debris from blocking surface drainage inlets and mechanical and electrical systems which remain in operation.

### 3.04 EXISTING SERVICES

- .1 Comply with Section 01 11 00 - Summary of Work, and:
  - .1 Arrange to shut off valves, panels and other elements of utility systems within existing building to segment fourth floor renovation shut-down works with remaining building to remain operational.
    - .1 If a system(s) cannot be isolated for the fourth floor, notify Owner's representative and Consultant in writing.
    - .2 Do not proceed with work until all systems have been isolated.
  - .2 Provide temporary utilities, bypassing selective demolition areas, to maintain continuity of service to other parts of building and in accordance with Section 01 51 00 - Temporary Utilities.
  - .3 Begin selective demolition work after utility disconnections are completed and verified in writing.

### 3.05 DEMOLITION

- .1 Demolish items as indicated on the Drawings and required to facilitate new construction.
  - .1 Demolish selective building items in accordance with CSA Z783.
  - .2 Demolish and dismantle work in a neat and orderly manner.
  - .3 Leave work in safe and stable condition at end of each work day.
  - .4 Demolish in a manner to minimize dust and to prevent migration of dust outside of work area.
  - .5 Remove concrete bases by cutting and chipping, take precautions against slab cracking and degradation. Grind edges smooth, fill, and make level with self-levelling grout.
  - .6 Demolish designated carpet, resilient flooring, and adhesive remnants:
    - .1 Vacuum existing carpet thoroughly, prior to removal, using vacuum equipped with power head or sweeper.
    - .2 Apply fine mist water spray to carpet as required to minimize dust generation during removal. Avoid spraying near electrical outlets.
    - .3 Demolish designated carpet and resilient floor finishes.
    - .4 Remove adhesive to the greatest extent possible:
      - .1 Do not use solvent-based cleaners to remove adhesive remnants.
      - .2 Lightly shot blast or grind floor using machine designed for purpose to remove adhesive remnants.
      - .3 Vacuum floor ready for application of skim coat.
    - .5 Repair slab depressions and damage with floor patching and levelling compound.
    - .6 Skim coat floor with minimum one (1) millimetre (mm) thick floor patching and levelling compound compatible with new flooring materials.



- .7 Finish floor substrates smooth, free from ridges and depressions, and adhesive remnants that could telegraph through resilient flooring materials and carpets.
- .7 Demolish existing ceramic tile finishes. Remove setting bed or adhesive to the greatest extent possible.
  - .1 Lightly shot blast or grind floor to remove setting material remnants.
  - .2 Vacuum floor ready for application of skim coat.
  - .3 Repair slab depressions and damage with floor patching and levelling compound. Skim coat floor with minimum one (1) mm thick floor patching and levelling compound compatible with new flooring materials.
- .2 Concrete:
  - .1 Locate reinforcing steel in concrete slabs with non-destructive, non-ionizing radio frequency locators prior to cutting or coring.
  - .2 Locate existing systems and elements within the ceiling space below prior to cutting or coring.
  - .3 Avoid reinforcing steel, electrical conduit, water pipes or other systems when coring concrete slabs. Adjust core locations and coordinate with the Owner's representative and Consultant where slab features interfere with core drilling.
    - .1 Provide marked up floor plan with dimensions of all obstructions and limitations within the proposed coring area.
  - .4 Notify the Owner's representative and Consultant immediately for further instructions where coring or cutting will damage existing slab features.
  - .5 Do not start any coring until confident that no damage will take place to the slab or surrounding systems.
  - .6 Demolish in small sections.
  - .7 Cut concrete, with power driven saws, to minimum nineteen (19) mm depth at junctures with construction to remain, up to full depth at junctures with construction to remain, and at regular intervals, with power driven saws. Remove concrete between saw cuts.
  - .8 Neatly trim openings to dimensions indicated.

### 3.06 REMOVAL AND REINSTALLATION

- .1 Remove items as scheduled and/or as indicated on Drawings.
- .2 Examine removed items. Confirm Owner's representative's acceptance for reinstallation if removed items appear in poor condition.
- .3 Temporarily store, protect, and prepare removed items for reuse.
  - .1 Stockpiling:
    - .1 Label stockpiles; indicate material types and quantities.
    - .2 Stockpile materials in convenient location for use in new construction to eliminate double handling wherever possible.

- .3 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.
- .4 Reinstall removed items as indicated in Schedule or on Drawings.

### 3.07 REMOVAL AND SALVAGE

- .1 Remove items as scheduled and/or as indicated on Drawings.
- .2 Store and protect removed items where acceptable to the Owner, and deliver to Owner's designated storage location (within same building).

### 3.08 RESTORATION

- .1 Floors and walls:
  - .1 Patch and repair floor and wall surfaces that extend from one finished area into another.
  - .2 Provide level, smooth surfaces with uniform finish colours, textures, and appearances.
  - .3 Replace floor and wall coverings with new materials, if necessary, to achieve uniform colour and appearance.
  - .4 Patch with durable seams that are as invisible as possible.
  - .5 Provide materials and comply with installation requirements specified in other technical sections.
  - .6 Painted surface patching: Apply primer and intermediate paint coats over patch and apply final paint coat over entire unbroken surface containing patch. Provide additional coats until patch blends with adjacent surfaces.
  - .7 Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
  - .8 Gypsum board walls:
    - .1 Fill openings with gypsum board and framing to match existing, skim coat to make wall smooth and even.
    - .2 Patch and repair wall surfaces with skim coat of gypsum board patching compound. Finish wall surfaces smooth and even, ready for new wall finishes. All existing gypsum board walls to be patched and repaired to achieve Level 4 finish, refer to Section 09 21 16 – Gypsum Board Assemblies.
    - .3 Bring existing gypsum board walls previously located above ceilings, now planned to be exposed and/or below ceilings, up to minimum Level 4 finish, refer to Section 09 21 16 – Gypsum Board Assemblies.
      - .1 Provide new sealant joints between dissimilar materials to create clean, straight joint including but not limited to gypsum board walls to horizontal concrete slabs. Refer to Section 07 92 00 – Joint Sealants.
  - .9 Concrete masonry walls:
    - .1 Fill openings with concrete masonry units, coursing to match existing; prepare ready to receive new finishes to match existing.

- .2 Co-ordinate with Section 07 84 00 – Firestopping.
- .2 Patch and repair mechanical equipment, and electrical fixtures damaged or exposed during demolition to match adjacent finished surfaces.
- .3 Adjust junction boxes, receptacles, and switch boxes flush with new wall construction where additional layers to existing construction are indicated.
- .4 Remove permanent marker lines on exposed surfaces and at surfaces indicated for subsequent finish materials. Sealing or priming over permanent marker lines is not acceptable.

### **3.09 SITE QUALITY CONTROL**

- .1 Site inspections:
  - .1 Perform in accordance with Section 01 45 00 - Quality Control.

### **3.10 CLEANING**

- .1 Clean in accordance with Section 01 74 00 - Cleaning, and:
  - .1 Clean adjacent areas and work of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began. Adjacent areas include full pathway that material removals travel along to waste bins.
- .2 Waste management:
  - .1 Manage waste in accordance with Section 01 74 19 - Waste Management and Disposal, and:
    - .1 Take possession of demolished materials and remove from site.
      - .1 Storage and sale of removed items on site is not permitted.
    - .2 Remove stockpiled material designated for removal when it interferes with the work.
    - .3 Remove stockpiles of like materials designated for removal and alternate disposal option once material collection is complete.
    - .4 Disposal of waste volatile materials, including mineral spirits, oil, petroleum-based lubricants, or toxic cleaning solutions into watercourses, or storm- or sanitary sewers, is not permitted.
    - .5 Remove decayed, vermin infested, or otherwise dangerous or unsuitable materials and promptly dispose of waste off site.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 N/A

### **1.02 REFERENCE STANDARDS**

- .1 ASTM International (ASTM):
  - .1 ASTM A123/A123M-17, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
  - .2 ASTM A307-21, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
  - .3 ASTM A653/A653M-18, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  - .4 ASTM A792/A792M-10, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
  - .5 ASTM F3125/F3125M-22, Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength
- .2 Canadian General Standards Board (CGSB):
  - .1 CAN/CGSB-1.181-99, Ready—Mixed Organic Zinc—Rich Coating
- .3 CSA Group (CSA):
  - .1 CSA W47.1:19, Certification of Companies for Fusion Welding of Steel
  - .2 CSA W55.3-08, Certification of Companies for Resistance Welding of Steel and Aluminum
  - .3 CSA W59-18, Welded Steel Construction
  - .4 CSA S136-16, North American Specification for the Design of Cold-Formed Steel Structural Members
- .4 Canadian Sheet Steel Building Institute (CSSBI):
  - .1 CSSBI 51-06, Lightweight Steel Framing Design Manual with errata #1 and #2
  - .2 CSSBI Technical Bulletin Vol. 7, No. 2 September 2011, Standard Thicknesses for Canadian Lightweight Steel Framing Applications
- .5 National Research Council of Canada (NRC):
  - .1 National Building Code of Canada (NBC), 2020
- .6 The Master Painters Institute (MPI):
  - .1 Architectural Painting Specification Manual, current edition

- .7 ULC Standards (ULC):
  - .1 CAN/ULC-S101-14, Standard Method of Fire Endurance Tests of Building Construction and Materials

### **1.03 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, product literature, and data sheets for structural metal stud framing. Include product characteristics, performance criteria, physical sizes, metallic coatings, and limitations.
  - .2 Submit Workplace Hazardous Materials Information System (WHMIS), Safety Data Sheets (SDS).
- .3 Shop Drawings: Submit shop drawings prepared by the delegated design engineer bearing their stamp and signature.
  - .1 Indicate design loads, member sizes, materials, design thickness exclusive of coatings, coating specifications, connection and bracing details, screw sizes and spacing, and anchors.
  - .2 Indicate member and connection locations, dimensions, openings, and connections related work.
  - .3 Include erection diagrams and critical installation procedures as required.
  - .4 Indicate welds with welding symbols as defined in CSA W59.
- .4 Site Quality Control Submittals: Submit delegated design engineer's reports, as described in SITE QUALITY CONTROL in Part 3 of this Section.

### **1.04 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Welders: Companies certified to CSA W47.1 for fusion welding and CSA W55.3 for resistance welding.
  - .2 Licensed Professional: Delegated design engineer, licensed or registered professional engineer in the province of the Work, who is not the Consultant.
- .2 Test Reports: When requested, submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .3 Certificates: When requested, submit manufacturer's product certificates certifying materials comply with specified performance characteristics and criteria and physical requirements.

### **1.05 DELIVERY, STORAGE, AND HANDLING**

- .1 Perform in accordance with Section 01 61 00 - Common Product Requirements. Protect steel studs during transportation, site storage, and installation from corrosion and deformation.
- .2 Minimize outdoor exposure in coastal areas.

- .3 Storage and Handling Requirements:
  - .1 Store materials indoors in a clean and dry area, and in accordance with manufacturer's recommendations.
  - .2 If storing outdoors is unavoidable, loosely cover members above ground with non-plastic sheets with allowances to naturally ventilate. Slope materials to drain.
  - .3 Carefully handle and protect galvanized materials to prevent damage to zinc coating. Isolate galvanized materials from bare steel, copper, brass, plaster, mortar, pressure preservative treated wood, and recently poured concrete.
  - .4 Handle and lift prefabricated panels in a way that prevents permanent distortion to any member or collateral material.
  - .5 Replace defective or damaged materials with new ones.

## 2 PRODUCTS

### 2.01 DESIGN CRITERIA

- .1 Retain a professional engineer to design the load-bearing steel stud wall systems, as indicated in the Drawings and Schedule.
- .2 Design systems based on Limit States Design principles using factored loads and resistances.
- .3 Conform to the requirements of fire rated assemblies indicated on Drawings which have been tested in accordance with CAN/ULC-S101, as may be required.
- .4 Indicate dimensions of wall stud depth on Drawings. Design wall stud steel thicknesses as required by the Design Criteria. Use greater or lesser stud depths if approved by the Consultant.
- .5 Space wall studs at a maximum of 406 mm on centre (o.c.), unless a smaller spacing distance on centre is required by the Design Criteria.
- .6 Conform to the design thicknesses in the following table for wall studs, unless a thicker dimension is required by the Design Criteria.

Wall Stud Depth	Minimum Base Steel Thickness Exclusive of Coating	Design Thickness Exclusive of Coating
92 mm	0.836 mm	0.879 mm
102 mm	0.836 mm	0.879 mm
152 mm	0.836 mm	0.879 mm
203 mm	1.087 mm	1.146 mm

- .7 The minimum thickness for the bridging channel shall be 1.087 mm, unless a thicker bridging channel design thickness is required by the Design Criteria.

- .8 The minimum thickness for clip angles shall be 1.367 mm, unless a thicker clip angle thickness is required by the Design Criteria.
- .9 Design connections to accommodate vertical deflection movement of the building structure, frame shortening, and vertical tolerances without imposing axial loads onto the structural metal stud framing.
- .10 Limit free play in structural metal stud framing connections perpendicular to the plane of the framing to +/- 0.5 mm relative to the building structure.
- .11 Design components and assemblies to accommodate specified erection tolerances of the building structure.
- .12 Design bridging to prevent member rotation and member translation perpendicular to the minor axis. Allow for secondary stress effects due to torsion between lines of bridging. Do not rely on collateral sheathing to help restrain member rotation and translation perpendicular to the minor axis. Design bridging at a maximum of 1524 mm o.c. Design spacing of bridging at equal intervals over the span length of the member. Closer spacings may be required to satisfy structural requirements.
- .13 Design anchorage and splice details for bridging.
- .14 Design for local loading due to anchorage of cladding and interior wall mounted fixtures where indicated on Drawings.
- .15 Design head, sill, and jamb members and connections to frame openings larger than 100 mm in any dimension.
- .16 Design anchor top and bottom track to the building structure at a maximum spacing of 813 mm o.c. Closer spacings may be required to satisfy structural requirements.

## 2.02 MATERIALS

- .1 Steel: To CSA S136, fabricated from ASTM A653/A653M, Grade of steel as required by designated design engineer.
  - .1 Zinc coated steel sheet: Quality to ASTM A653/A653M, coating as required by designated design engineer.
  - .2 Aluminum-zinc alloy-coated steel sheet: Quality to ASTM A792/A792M, with coating as required by designated design engineer.

## 2.03 METAL FRAMING

- .1 Steel studs: To CSA S136, fabricated from metallic coated steel, depth as indicated.
  - .1 Minimum steel thickness: Meeting Design Criteria.
- .2 Steel Stud Designations: Colour code to CSSBI Technical Bulletin Vol.7, No. 2.
- .3 Stud tracks: Fabricated from same material and finish as steel studs, depth to suit.
  - .1 Bottom track: Single piece
  - .2 Top track: Two (2) piece telescoping unless otherwise required to meet Design Criteria.
- .4 Bridging: Meeting Design Criteria
- .5 Angle clips: Meeting Design Criteria

- .6 Tension straps and accessories: As indicated in shop drawings

## **2.04 ACCESSORIES**

- .1 Welding Materials: To CSA W59 and certified by the Canadian Welding Bureau.
- .2 Welding Electrodes: Minimum 490 MPa tensile strength series.
- .3 Screws: Pan head or low profile head, self-tapping sheet metal screws, minimum 0.008-mm thick zinc coating. Other coatings with equal or better protection will be considered. Cover Sheet metal screws with low profile heads with sheathing materials.
- .4 Concrete Anchors: Concrete expansion anchors or other suitable drilled type fasteners, minimum 0.008-mm-thick zinc coating. Other coatings with equal or better protection will be considered.
- .5 Bolts, nuts, washers: To ASTM A307 or ASTM F3125/F3125M. Hot-dipped galvanized to ASTM A123/A123M, coating as required by designated design engineer.
- .6 Touch-up Paint: Zinc-rich, to CAN/CGSB-1.181, MPI product #18, #19, or #20.
- .7 Powder actuated fasteners: Not permitted for fastening to structural steel or for fastening to concrete, unless otherwise accepted by Designated Design Engineer, minimum 0.008-mm thick zinc coating. Other coatings with equal or better protection will be considered.

## **2.05 SOURCE QUALITY CONTROL**

- .1 When requested, submit mill reports describing material properties.

## **3 EXECUTION**

### **3.01 EXAMINATION**

- .1 Verification of Conditions: Verify conditions of substrates previously installed are acceptable for structural metal stud framing.
  - .1 Inspect substrates and building structure floor flatness, and levelness. Inspect vertical structural members to ensure they are true and plumb.
  - .2 Proceed with installation only after unacceptable conditions are remedied.

### **3.02 ERECTION**

- .1 Erect structural metal stud framing to reviewed shop drawings and CSA S136.
- .2 Perform welding in accordance with CSA W59.
- .3 Erect components to requirements of reviewed shop drawings.
- .4 Anchor tracks securely to structure at a maximum of 800 mm o.c., unless lesser spacing is indicated on shop drawings.
- .5 Erect studs plumb, aligned, and securely attached in accordance with shop drawings. Penetration of sheet metal screws beyond joined materials shall be not less than three exposed threads.
- .6 Seat studs into bottom tracks and two (2) piece telescoping top track, unless alternative top track is indicated in shop drawings.



- .7 Install a minimum 50 mm telescoping track at top of walls where required to accommodate vertical deflection unless indicated otherwise in shop drawings.
  - .1 Nest top track into deflection channel.
  - .2 Do not fasten tracks together.
  - .3 Stagger joints of top tracks.
- .8 Install studs at a maximum of 50 mm from abutting walls, openings, and each side of corners and terminations with dissimilar materials.
- .9 Brace steel studs with horizontal internal bridging at a maximum 1500 mm.
  - .1 Fasten bridging to steel clips fastened to steel studs with screws or by welding.
- .10 Frame openings in stud walls to adequately carry loads by using additional framing members and bracing as detailed on shop drawings.
- .11 Cutouts: Maximum size of cutouts for services as follows:

Member Depth	Across Member Depth	Along Member Length	On Centre Spacing
92 mm	Max. 40 mm	Max. 105 mm	Min. 600 mm
102 mm	Max. 40 mm	Max. 105 mm	Min. 600 mm
152 mm	Max. 65 mm	max. 115 mm	Min. 600 mm

- .1 Limit distance from centre line of last unreinforced cutout to end of member to a maximum of 300 mm.
- .12 Tolerances:
  - .1 Plumb: Maximum 1/500th of member length
  - .2 Camber: Maximum 1/1000th of member length
  - .3 Spacing: Maximum +/- 3 mm from design spacing
  - .4 Gap between end of stud and track web: Maximum 4 mm

### 3.03 SITE QUALITY CONTROL

- .1 Site Tests and Inspections: Structural metal stud framing delegated design engineer responsible for shop drawings to perform the following:
  - .1 Periodically inspect structural metal stud framing work at Project site, including inspection of welded and screwed system connections; connections to primary building structural elements; review member sizes, locations, steel thicknesses, coating thicknesses; erection tolerances; and framing members cut or altered at the Project site.
  - .2 Review mill test reports.

- .3 Submit report(s) and a confirmation letter signed and sealed, as described in QUALITY ASSURANCE in Part 1 of this Section and as may be required by the Authority Having Jurisdiction.
- .2 Non-Conforming Work: Replace members with localized damage.

#### **3.04 ADJUSTING**

- .1 Touch-up welds with one coat of zinc-rich primer. Before applying paint, prepare surface in accordance with paint manufacturer's recommendations.

#### **3.05 CLEANING**

- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

#### **3.06 SCHEDULE**

- .1 Load-bearing metal framing to be undertaken by designated design engineer for new walls receiving wall-mounted fixtures and millwork within Men's and Women's Washrooms R4-24 and R4-25.
  - .1 Assume a linear load of 160 kilograms (kg) per 300 mm for lavatory millwork suspended from structural stud framing.
  - .2 Confirm urinal and toilet loading requirements with corresponding submittals.

**END OF SECTION**

## **1 GENERAL**

### **1.01 SUMMARY**

- .1 Section Includes:
  - .1 Miscellaneous metal fabrications

### **1.02 RELATED REQUIREMENTS**

- .1 Section 06 40 00 – Architectural Woodwork
- .2 Section 09 91 23 - Interior Painting
- .3 Section 10 28 00 – Toilet Bath and Laundry Accessories

### **1.03 DEFINITIONS**

- .1 N/A

### **1.04 REFERENCE STANDARDS**

- .1 ASTM International (ASTM):
  - .1 ASTM A53/A53M-22, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
  - .2 ASTM A307-21, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
- .2 CSA Group (CSA):
  - .1 CSA G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
  - .2 CSA S16:19, Design of Steel Structures
  - .3 CSA W48:23, Filler Metals and Allied Materials for Metal Arc Welding
  - .4 CSA W59-18, Welded Steel Construction (Metal Arc Welding)
- .3 The Master Painters Institute (MPI):
  - .1 Architectural Painting Specification Manual (ASM), current edition
  - .2 Approved Products List (APL), current edition
- .4 Coordination:
  - .1 Coordinate with Section 06 40 00 – Architectural Woodwork for custom support design and integration.
  - .2 Coordinate with Section 09 91 23 - Interior Painting for site finishing items installed on site.

### **1.05 ACTION AND INFORMATIONAL SUBMITTALS**

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

- .2 Submit the following action submittals before starting work of this section:
  - .1 Product Data: Product literature and data sheets for installed products, including product characteristics, performance criteria, physical sizes, finishes, and limitations.
    - .1 WHMIS SDS for site-applied primers, coatings, paints, and other finishes.
  - .2 Shop Drawings:
    - .1 Sealed and signed by a qualified professional in accordance with Section 01 43 00 – Quality Assurance.
    - .2 Indicate materials, base metal thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
    - .3 Indicate attachment points and method between architectural woodwork and metal fabrication. Coordinate with Section 06 40 00 – Architectural Woodwork and related subtrade.
- .3 Submit the following informational submittals as work progresses:
  - .1 Certificates: Signed by the manufacturer certifying materials comply with specified performance characteristics and physical properties.

## **1.06 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Licensed Professional: Delegated design engineer, licensed or registered professional engineer in the province of the Work, who is not the Consultant.

## **2 PRODUCTS**

### **2.01 MATERIALS**

- .1 Steel Sections and Plates: To CSA G40.20/G40.21, Grade 300W or 350W.
- .2 Steel Shapes: To CSA G40.20/G40.21, Grade 350W.
- .3 Steel Tubes: To CSA G40.20/G40.21, Grade 350W.
- .4 Welding Materials: To CSA W59.
- .5 Welding Electrodes: To CSA W48 Series.
- .6 Bolts and Anchor Bolts: To ASTM A307, galvanized to ASTM A153/A153M.
- .7 Grout: Non-shrink, non-metallic, flowable, 15 Megapascal (MPa) at 24 hours.

### **2.02 FABRICATION**

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Use self-tapping, shake-proof flat-headed screws on items requiring assembly by screws or as indicated.
- .3 Where possible, fit and shop-assemble work, ready for erection.

- .4 Make exposed welds continuous for length of each joint. File or grind exposed welds smooth and flush.

## **2.03 MISCELLANEOUS FABRICATIONS**

- .1 Miscellaneous Framing and Supports: Provide steel framing and supports for applications indicated that are not part of structural steel framework, as required to complete the Work.
- .2 Fabricate units to sizes, shapes, and profiles indicated and required to receive adjacent construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitred joints for site connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.
- .3 Shop coat prime miscellaneous fabrications after fabrication. Touch-up primer in the field if scratched or removed during installation process. Field paint.

## **2.04 FINISHES**

- .1 Primer Materials:
  - .1 Shop coat primer: To MPI ASM INT 5.1-G.
- .2 Shop Finishing Methods:
  - .1 Shop prime painting: In accordance with MPI ASM.
    - .1 Apply one shop coat of primer to metal items, with the exception of galvanized or concrete encased items.
    - .2 Use unadulterated primer as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, and grease when temperature is a minimum seven degrees Celsius (7°C).
    - .3 Clean surfaces to be site welded; do not paint.
    - .4 Leave surfaces to be welded and surfaces receiving sprayed fireproofing unpainted and unprimed.
    - .5 Leave surfaces to be embedded in concrete unpainted.
    - .6 Apply two coats of primer to parts inaccessible after final assembly.

## **2.05 ACCESSORIES**

- .1 Protective Film: Treated paper or clear plastic, self-adhering release type as recommended by architectural metal fabricator to protect finished metals. Film to be easily removable without damaging finished surfaces.

## **3 EXECUTION**

### **3.01 VERIFICATION**

- .1 Verify all surfaces and areas are ready to receive miscellaneous metal fabrications.
- .2 Verify that all dimensions match those in the shop drawings.
- .3 Do not proceed with installation until all unsatisfactory conditions are corrected.

### 3.02 PREPARATION

- .1 Thoroughly clean and suitably pre-treat steel prior to finishing.
- .2 Remove loose mill scale, rust, oil, grease, dirt, and other foreign matter using one or more of the following methods:
  - .1 solvent cleaning
  - .2 wire brushing
  - .3 power wire brushing
  - .4 abrasive blasting
- .3 Grind sharp projections until smooth.
- .4 Prepare metal surfaces to receive paint finishes in accordance with MPI ASM.

### 3.03 INSTALLATION – GENERAL

- .1 Install metal fabrications as indicated on Drawings.
- .2 Install in accordance with reviewed shop drawings, square, plumb, straight, true, accurately fitted, and with tight joints and intersections.
- .3 Perform welding in accordance with CSA W59 unless specified otherwise.
- .4 Provide suitable anchorage such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles as indicated on reviewed shop drawings.
- .5 Provide exposed fastening devices to match finish and be compatible with material through which they pass.
- .6 Make site connections with fasteners to CSA S16 or site-welded connections, as required by designed design engineer and reviewed by Consultant during shop drawing submittal review.
- .7 Touch up rivets, site welds, bolts, and burnt or scratched surfaces with primer after installation.

### 3.04 SCHEDULE

- .1 Miscellaneous Fabrications:
  - .1 The Hub R4-03: Floating Counter Support
    - .1 Refer to drawings for design intent
    - .2 Provide designated design engineer shop drawings
    - .3 Assume a linear load of 160 kg per 300 mm, not including metal and countertop millwork self-weight.
  - .2 Men's & Women's Washrooms R4-24 and R4-25: Ceiling-hung toilet partition supports.
    - .1 Provide support directly above ceiling grid for ceiling-hung toilet partitions.
    - .2 Field verify all adjacent conditions for anchorage and suspension. Coordinate design around all existing elements to remain and all new systems and components above the ceiling grid.

- .3 Provide designated design engineer shop drawings.
- .4 Coordinate with Section 10 21 13 - Metal toilet Compartments.

**END OF SECTION**

## **1 GENERAL**

### **1.01 SECTION INCLUDES**

- .1 Miscellaneous rough carpentry, including:
  - .1 Minor rough carpentry
  - .2 Wood blocking
  - .3 Information Technology, Data and electrical panel back boards

### **1.02 RELATED REQUIREMENTS**

- .1 N/A

### **1.03 DEFINITIONS**

- .1 N/A

### **1.04 REFERENCE STANDARDS**

- .1 The American Society of Mechanical Engineers (ASME):
  - .1 ASME B18.6.1-1981, Wood Screws (Inch Series)
- .2 American National Standards Institute/Telecommunication Industry Association (ANSI/TIA):
  - .1 ANSI/TIA/EIA 569 B-2004, Commercial Building Standard for Telecommunications Pathways and Spaces
- .3 ASTM International (ASTM):
  - .1 ASTM A307-21 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength.
  - .2 ASTM C954-11, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness
  - .3 ASTM D7612-10, Standard Practice for Categorizing Wood and Wood-Based Products According to their Fiber Sources
  - .4 ASTM F1667-13 Standard Specification for Driven Fasteners: Nails, Spikes and Staples
- .4 CSA Group (CSA):
  - .1 CSA O121-08, Douglas Fir Plywood
  - .2 CSA O141-05, Softwood Lumber
  - .3 CSA O151-09, Canadian Softwood Plywood
  - .4 CSA O153-13, Poplar Plywood
  - .5 CSA O325-07, Construction Sheathing
- .5 Canadian Wood Council:
  - .1 Wood Design Manual 2010 edition



- .6 National Lumber Grades Authority (NLGA):
  - .1 Standard Grading Rules for Canadian Lumber 2017
  - .2 NLGA SPS-2-2013, Machine Graded Lumber
- .7 ULC Standards/UL Canada (ULC):
  - .1 CAN/ULC-S101-14, Standard Methods for Fire Endurance Tests of Building Construction and Materials
  - .2 CAN/ULC-S102-10, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies

#### **1.05 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 N/A

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- .1 Delivery and Acceptance Requirements: Protect materials from weather conditions while in transit and while on the jobsite
- .2 Storage and Handling Requirements:
  - .1 Store materials using pallets or blocking a minimum of 150 mm from the ground and covered with protective waterproof sheets allowing for air circulation and ventilation under the covering.
  - .2 Protect edges and corners of sheet materials from damage during handling and storage.
  - .3 Protect kiln-dried and seasoned wood materials from conditions that will cause an increase to moisture content.
  - .4 Store separated reusable wood waste convenient to cutting station and work areas.

### **2 PRODUCTS**

#### **2.01 DESCRIPTION**

- .1 Regulatory Requirements:
  - .1 Lumber Grades: Provide lumber products that are all sides finished (S4S) in nominal dimensions required for the project; grade-marked by accredited agencies of the Canadian Lumber Standards Accreditation Board and that conform to National Grading Rules published by the NLGA.
    - .1 Grading: Machine Grading, Visual Grading, or Both
    - .2 Moisture Content: Kiln Dry or Air Dry, 19% or less
    - .3 Structural Design Properties: Strength and related properties in accordance with CSA O86, where acting in structural capacity.
    - .4 Sizes: Nominal dressed dimensions described in CSA O141 for surfaced dry conditions and wood species.

- .2 Panel Grades: Provide panel products that are grade-marked by agencies recognized by CSA O325 and National Institute of Standards and Technology, Voluntary Product Standard PS 2 04 Performance Standard for Wood-Based Structural-Use Panels as modified by other listed CSA panel standards.

## **2.02 PERFORMANCE CRITERIA**

- .1 Plywood Grades: Provide plywood products in nominal dimensions required for the project; grade-marked by accredited agencies of the APA and that conform to the Canadian Plywood Grading Guide, and tolerances described for specific plywood Products below, and identified as follows:
  - .1 Name of Standard CSA O121;
  - .2 Manufacturer's Mill Identification;
  - .3 Bond Quality (Exterior or Interior);
  - .4 Commercial Species Grouping (DFP, CSP, ASP or HEM-FIR);
  - .5 Product Grade (SHG, SEL, SEL TF, G1S or G2S);
  - .6 Nominal Thickness; and
  - .7 Additional Grade or Product Designations (if applicable).
- .2 Lumber Grades: Provide lumber products that are all sides finished (S4S) in nominal dimensions required for the project; grade marked by accredited agencies of the Canadian Lumber Standards Accreditation Board and conform to National Grading Rules published by the National Lumber Grades Authority, and as follows:
  - .1 Grading: Machine Grading, Visual Grading, or Both.
  - .2 Moisture Content: Kiln Dry or Air Dry, 19% or less.
  - .3 Structural Design Properties: Strength and related properties in accordance with CSA O86 and NLGA SPS 2.
  - .4 Sizes: Nominal dressed dimensions described in CSA O141 for surfaced dry conditions and wood species.
  - .5 Acceptable Alternative Products: Lumber products meeting requirements of the American Lumber Standards Committee designated ALS Program Lumber and that are accepted by the Canadian Lumber Standards Accreditation Board, may be acceptable for the Project when proof of compliance with strength and related properties meeting CSA O86 are submitted before purchasing any lumber products.

## **2.03 MATERIALS**

- .1 Lumber Materials:
  - .1 Miscellaneous Framing: Provide furring, blocking, and other materials within framed construction, use Light Framing, No. 2 Grade or better.

- .2 Panel Materials:
  - .1 Plywood Blocking and Backing Panels: Douglas Fir and Canadian Softwood Plywood using exterior grade adhesives meeting requirements of CSA O121 or CSA O151; kiln dry plywood to moisture content of 15% or less, and as follows:
    - .1 Concealed Blocking: Select Grade (SEL) Canadian Softwood Plywood.
    - .2 Exposed Panels and Panel Boards: Good One Side (G1S) Douglas Fir Plywood.
    - .3 Fire Rated Intumescent Coating: As recommended by reputable Intumescent Coating manufacturer.
  - .2 Fire-Retardant Treated Wood (FRTW): Fire-retardant treatment of dimensional lumber and plywood, to industry standard and required fire resistance rating required by the Ontario Building Code and AHJ or Consultant.

## 2.04 ACCESSORIES

- .1 Driven Fasteners: Steel nails, spikes, brads and staples meeting requirements of ASTM F1667. Ensure length is sufficient to penetrate connecting solid wood materials.
  - .1 Interior High Humidity Work: Hot-dipped galvanized.
  - .2 Interior Work: Electroplated zinc plated, or cadmium plated.
- .2 Rough Hardware (Bolts, Nuts and Washers): Provide manufacturer recommended fastening devices and anchors meeting requirements of ASTM A307 and as follows:
  - .1 Interior High Humidity Work: Hot-dipped galvanized.
  - .2 Interior Work: Electroplated zinc plated, or cadmium plated.
- .3 Wood Screws: Steel screws meeting requirements of ASME B18.6.1 and as follows:
  - .1 Interior Work: Galvanized.
- .4 Screws for Fastening to Cold-Formed Metal Framing: Steel screws meeting requirements of ASTM C954, except for wafer heads and reamer wings whose length should be as recommended by screw manufacturer for material being fastened.
- .5 General Purpose Adhesive: CSA O112.9.
- .6 Nailing Discs: Flat caps, minimum 25-mm diameter, minimum 0.4 mm thick, sheet metal, fibre, formed to prevent dishing. Bell or cup shapes not acceptable.

## 3 EXECUTION

### 3.01 EXAMINATION

- .1 Verification of Conditions: Verify conditions of substrates previously installed are acceptable for product installation in accordance with manufacturer's instructions.
  - .1 Visually inspect substrate.
  - .2 Inform Owner's representative and Consultant of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

### 3.02 INSTALLATION

- .1 Requirements:
  - .1 Accurately frame and properly assemble rough carpentry work.
  - .2 Securely attach rough carpentry work to substrate by anchoring and fastening.
  - .3 Include required nails, fastenings and other connectors.
  - .4 Set rough carpentry to required levels and lines with members plumb, true to line, cut, and fitted.
  - .5 Fit rough carpentry to other construction.
  - .6 Scribe and cope as needed for accurate fit.
  - .7 Locate furring, nailers, blocking, grounds, and similar supports as required when attaching to other construction.
  - .8 Do not use materials with defects that impair the quality of the rough carpentry or use pieces that are too small to use with a minimum number of joints or optimum joint arrangement.
  - .9 Do not install wood in direct contact with concrete or concrete masonry units unless otherwise directed by Consultant.
    - .1 If direct contact is required, ensure material is provided to prevent the transfer of moisture between concrete, concrete masonry units and wood.
- .2 Information Technology (IT) and Data Panel Boards:
  - .1 Install 19-mm DFP G1S plywood on rear wall (opposite doors) in IT and data rooms receiving wiring and equipment. Minimum 1200 mm x 2400 mm size.
  - .2 Coordinate installation and locations with electrical and Owner's representatives for IT.
  - .3 Paint panels with two (2) coats of light-coloured fire-retardant paint finish; coat all sides of panels (back, front and sides) to meet the intent of fire-resistance rated panel requirements and in accordance with ANSI/TIA/EIA 569-B standard requirements; install to manufacturer's instructions and requirements.

### 3.03 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - Cleaning.
- .2 Final Cleaning: Upon completion, remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

### 3.04 PROTECTION

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

**END OF SECTION**

## 1 GENERAL

### 1.01 RELATED REQUIREMENTS

- .1 Section 07 92 00 - Joint Sealants: Sealant materials and application.
- .2 Section 05 50 00 – Metal Fabrications

### 1.02 REFERENCE STANDARDS

- .1 American National Standards Institute (ANSI)
  - .1 ANSI/ASME 18.6.1 1981 (R2012) Wood Screws (Inch Series).
  - .2 ANSI/BHMA A156.9-2010, Cabinet Hardware.
  - .3 ANSI/BHMA A156.11-2014, Cabinet Locks.
  - .4 ANSI/BHMA A156.16-2013, Auxiliary Hardware.
  - .5 ANSI/BHMA A156.18-2012, Materials and Finishes.
  - .6 ANSI/BHMA A156.20-2006, Strap and Tee Hinges and Hasps.
  - .7 ANSI A208.2-09, Medium Density Fiberboard (MDF) for Interior Applications.
  - .8 ANSI/HPVA HP-1-10, Standard for Hardwood and Decorative Plywood.
- .2 Architectural Woodwork Manufacturers Association of Canada (AWMAC)
  - .1 Architectural Woodwork Standards (AWMAC AWS), 2014.
- .3 ASTM International (ASTM)
  - .1 ASTM A 153/A 153M-16, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - .2 ASTM E 1333-14, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates From Wood Products Using a Large Chamber.
  - .3 ASTM F1667-13 Standard Specification for Driven Fasteners: Nails, Spikes and Staples.
- .4 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-11.3-[M87], Hardboard.
  - .2 CAN/CGSB-71.20-[M88], Adhesive, Contact, Brushable.
  - .3 CAN/CGSB-71.19-[M88], Adhesive, Contact, Sprayable.
- .5 Green Seal Environmental Standards (GS)
  - .1 GS-36-2013, Adhesives for Commercial Use.
- .6 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Safety Data Sheets (SDS).
- .7 National Electrical Manufacturers Association (NEMA)
  - .1 ANSI/NEMA LD-3-05, High-Pressure Decorative Laminates (HPDL).

### 1.03 PREINSTALLATION MEETING

- .1 Before enclosing framing, convene a meeting of contractor, casework fabricator, casework installer, and framing subcontractor.
  - .1 Review locations of backing required for casework installation as shown on shop drawings and as necessary for installation.
  - .2 Review method of attachment for backing to wall system.
  - .3 Review coordination with other affected sections.

### 1.04 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Prepare and submit material list in accordance with AWMAC AWS, cross-referenced to specifications.
  - .2 Include manufacturer's instructions, printed product literature, data sheets and catalogue pages for all materials and products to be incorporated into architectural wood casework and include product characteristics, performance criteria, dimensions and profiles, finish and limitations on use.
  - .3 Submit one digital copy of WHMIS SDS in accordance with Section 01 35 29 - Health, Safety, and Emergency Response Procedures.
- .3 Hardware List:
  - .1 Submit hardware list cross-referenced to specifications.
  - .2 Include manufacturer's specification sheets indicating name, model, material, function, finish and other pertinent information.
    - .1 Provide Builders Hardware Manufacturers Association (BHMA) designations if manufacturer is voluntarily in the program.
- .4 Shop Drawings:
  - .1 Prepare and submit shop drawings in accordance with AWMAC AWS and as follows.
  - .2 Submit one digital set of shop drawings for initial review in accordance with requirements of Division 01. Revise as directed, submit one digital copy for final acceptance and distribution. Revise as many times as necessary to comply with Contract Documents to the satisfaction of the Consultant.
  - .3 Indicate details of construction, profiles, jointing, fastening and other related details at appropriate scales for legibility.
  - .4 Indicate materials, thicknesses, finishes and hardware.
  - .5 Indicate locations of service outlets in casework, typical and special installation conditions, and connections, attachments, anchorage and location of exposed fastenings.
  - .6 Show location on casework elevations of backing required in supporting structure for attachment of casework.

**Commented [LT1]:** Is this correct?  
Also, since BHMA is voluntary only, it can't be a mandatory requirement.

- .7 Indicate AWMAC AWS quality grade where different from predominant grade specified.
- .8 Include color schedule of all casework items, including all countertop, exposed, and semi-exposed cabinet finishes, finish material manufacturer, pattern, and color.
- .5 Samples:
  - .1 Prepare and submit samples in accordance with AWMAC AWS and as follows.
  - .2 Submit duplicate samples of laminated plastic for each specified colour selection.
  - .3 Submit duplicate samples of laminated plastic joints, edging, cutouts and post-formed profiles.
  - .4 Certifications: If requested by Consultant, submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
  - .5 Submit statement of experience and qualifications of architectural wood casework fabricator.

#### 1.05 QUALITY ASSURANCE

- .1 Perform Work of this Section by single architectural wood casework fabricator with minimum five (5) years of current architectural casework production experience and having completed minimum one project in the past five (5) years with value within 20% of the cost of the work of this Section.

#### 1.06 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Deliver wood casework only when area of work is enclosed, plaster and concrete work is dry, and area is broom clean and site environmental conditions are acceptable for installation.
- .3 Protect millwork against dampness and damage during and after delivery.
- .4 Store millwork in ventilated areas, protected from extreme changes of temperature and humidity, and within range recommended by AWMAC AWS for location of project.
- .5 Store materials indoors, in dry location, in clean, dry, well-ventilated area.
- .6 Protect architectural woodwork and hardware from nicks, scratches, and blemishes.
- .7 Replace defective or damaged materials with new.

### 2 PRODUCTS

#### 2.01 QUALITY GRADE

- .1 Provide all materials and perform all fabrication in accordance with AWMAC AWS Custom Grade.
- .2 In case of conflict between Contract Documents and AWMAC AWS grade requirements, AWMAC AWS govern.

## 2.02 LUMBER

- .1 Softwood and Hardwood Lumber: Sound lumber to specified AWMAC AWS quality grade requirements, kiln-dried to moisture content recommended by AWMAC AWS for location of the Work
- .2 Machine stress-rated lumber is acceptable for all purposes.

## 2.03 SHEET MATERIALS

- .1 Medium Density Fibreboard (MDF) core: to ANSI A208.2, density 769 kg/m<sup>3</sup>, 19 mm thick unless indicated otherwise.
  - .1 Use moisture resistant Moisture Resistant (MR) grade for countertops and splash-backs to receive plumbing fixtures.
- .2 Solid Surfacing: Homogeneous filled cast polymeric resin panel.

## 2.04 LAMINATED PLASTIC MATERIALS

- .1 Laminated plastic for flatwork: to NEMA LD3
  - .1 High Pressure Decorative Laminated (HPDL) plastic.
    - .1 Type: General Purpose (GP).
    - .2 Horizontal Surfaces: Horizontal Grind Satin (HGS) or Horizontal Grind Linear (HGL) to suit application, 1.15 mm thick minimum.
    - .3 Vertical Surfaces: Vertical Directional Satin (VDS) or Vertical Grind Linear (VGL) to suit application, 0.6 mm thick minimum.
    - .4 Colour & Pattern: As indicated in Schedule.
    - .5 Finish: matt, unless indicated otherwise.
    - .6 Manufacturer: Wilsonart, Formica, or accepted equivalent.
  - .2 Laminated plastic for backing sheet:
    - .1 Type: backer.
    - .2 Thickness: not less than 0.5 mm thick or same thickness as face laminate.
    - .3 Colour: same colour as face laminate.
  - .3 Thermofused Melamine: to NEMA LD3 Grade LPDL.
    - .1 High wear resistant thermofused melamine: equal or exceed 400 cycles (Minimum standard for HPL abrasion test).
    - .2 Colour: White.
  - .4 Edge finishing for doors, drawer fronts, shelves and false fronts:
    - .1 HPDL to match face.
  - .5 Laminated plastic adhesive:
    - .1 Adhesive: as required by Manufacturer.
      - .1 Urea resin adhesive to CSA O112
      - .2 Contact adhesive to CAN/CGSB-71.20



- .3 Resorcinol resin adhesive to CSA O112.10
- .4 Polyvinyl adhesive to CSA O112-M
- .5 Two component epoxy thermosetting adhesive.

## 2.05 CASEWORK FABRICATION - GENERAL

- .1 Fabricate casework of specified core and surface finish materials to specified AWMAC AWS quality grade
  - .1 Construction type: frameless.
  - .2 Door-cabinet interface: flush overlay.
- .2 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.
- .3 Shelving to cabinetwork to be adjustable unless otherwise noted.
- .4 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.
- .5 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.
- .6 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.

## 2.06 LAMINATED PLASTIC CASEWORK FABRICATION

- .1 Do laminated plastic fabrication in compliance with NEMA LD3, Annex A and specified AWMAC AWS quality grade.
- .2 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .3 Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Use continuous lengths up to 3000 mm. Keep joints 600 mm from sink cutouts.
- .4 Form shaped profiles and bends as indicated, using post-forming grade laminate to laminate manufacturer's instructions.
- .5 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.
- .6 Apply laminate backing sheet to reverse side of core of plastic laminate work.
- .7 Apply melamine to interior of cabinetry (cupboards and drawer interiors).
- .8 Drawer Construction:
  - .1 Sides:
    - .1 Custom grade: LPDL (melamine) on MDF, thickness 12 mm.
  - .2 Bottoms: MDF with melamine surfaces, thickness 6 mm.
  - .3 Joinery: Meeting requirements of AWMAC for Grade specified.
    - .1 Sides, front and back: Miter fold.

## 2.07 SOLID SURFACING COUNTEROPS

- .1 Solid Surface Surfacing:
  - .1 Colour: As selected by Consultant from manufacturer's first four pricing grades.
  - .2 Edge Treatment: Waterfall edge or as detailed.
  - .3 Prepared for sink. Co-ordinate with plumbing requirements.
  - .4 Backsplash: Butt joint, height four (4) inches, located around all edges of counter that are in contact with a gypsum board wall.
  - .5 Manufacturer: Wilsonart, Corian, or accepted equivalent.

## 2.08 CABINET HARDWARE

- .1 Cabinet hardware: to AWMAC AWS quality grade specified and to ANSI/BHMA A156.9.
  - .1 Quantities as recommended by manufacturer and required in Drawings and this section.
- .2 Finish:
  - .1 Exposed hardware: as indicated in this section.
  - .2 Semi-exposed hardware: Manufacturer's standard finish.
- .3 Casework door hinges: knuckle disappearing type, minimum 170° opening.
  - .1 Basis of design: Blum, or acceptable equivalent.
- .4 Door Dampener: as required for all doors to be soft closing.
  - .1 Basis of design: Blum, or acceptable equivalent.
- .5 Pulls: back mounted pull, minimum one (1) per cabinet door and cabinet drawer front.
  - .1 Basis of design: Richelieu Modern Steel Pull, 305, brushed nickel finish, length overall 156 mm, or acceptable equivalent.
- .6 Latches: elbow latch, at all double door locations.
  - .1 Basis of design: Richelieu Heavy Duty Elbow Catch # 5540180, nickel finish , or acceptable equivalent.
- .7 Bumpers: Polyurethane 3mm high x 10 mm diameter, minimum two (2) per door and drawer front.
- .8 Shelf brackets and standards: vertical slotted shelf standard, with shelf brackets, for finished to white enamel finish, fully recessed into gables.
  - .1 Basis of Design: KV255 pilaster and KV256 clip, or acceptable equivalent.
- .9 Drawer slides:
  - .1 Slide type: bottom edge mounted or side mounted drawer slides, as recommended by fabricator and AWMAC standards.
  - .2 Soft closing.
  - .3 Extension and capacity: full extension, meeting requirements of AWMAC AWS for type and size of drawer, 45 kg capacity per slide.

## 2.09 ACCESSORIES

- .1 Countertop support brackets:
  - .1 Basis of Design: Kolosuss Concealed Bracket, or acceptable equivalent.
    - .1 Material: Aluminum
    - .2 Finish: White
    - .3 Weight capacity: 135 kg minimum
    - .4 Coordinate with Section 05 41 00 – Structural Metal Stud Framing and related shop drawing.
  - .2 Wood screws: stainless steel type and size to suit application.
  - .3 Nails and staples: to CSA B111 and ASTM F1667.
  - .4 Splines: plastic.

## 3 EXECUTION

### 3.01 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for architectural woodwork installation in accordance with manufacturer's instructions.
  - .1 Visually inspect substrate.
  - .2 Inform Contractor and Consultant of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

### 3.02 INSTALLATION

- .1 Install architectural wood casework in accordance with AWMAC AWS grade for respective items
- .2 In case of conflict between Contract Documents and AWMAC AWS grade requirements, AWMAC AWS grade requirements govern.
- .3 Install prefinished millwork at locations shown on drawings.
  - .1 Position accurately, level, plumb straight.
- .4 Fasten and anchor millwork securely.
  - .1 Supply and install heavy duty fixture attachments for wall mounted cabinets.
- .5 Countersink mechanical fasteners at exposed and semi-exposed surfaces, excluding installation attachment screws and screws securing cabinets end to end.
- .6 Use draw bolts in countertop joints.
- .7 Scribe and cut as required to fit abutting walls and to fit properly into recesses and to accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects.

- .8 Fit hardware accurately and securely in accordance with manufacturer's written instructions.
- .9 Make cutouts for inset equipment and fixtures using templates provided.

### 3.03 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.
  - .1 Clean millwork and inside cupboards and drawers and outside surfaces.
  - .2 Remove excess glue, pencil and ink marks from surfaces.

### 3.04 PROTECTION

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

### 3.05 SCHEDULES

- .1 Refer to Drawings for locations.
- .2 WD-1: HPDL
  - .1 Basis of Design: As selected by Consultant from Manufacturer's full premium line of options.
- .3 PL-1: HPDL
  - .1 Basis of Design: As selected by Consultant from Manufacturer's full premium line of options.
- .4 PL-2: HPDL
  - .1 Basis of Design: As selected by Consultant from Manufacturer's full premium line of options.
- .5 CT-1: Solid Surface Countertop & Backsplash
  - .1 Basis of Design: As selected by Consultant from Manufacturer's first four pricing classes of options.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 N/A

### **1.02 DEFINITIONS**

- .1 N/A

### **1.03 REFERENCE STANDARDS**

- .1 ASTM International (ASTM):
  - .1 ASTM C167-18, Standard Test Methods for Thickness and Density of Blanket or Batt Thermal Insulations
  - .2 ASTM C423-17 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
  - .3 ASTM E90-09, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
  - .4 ASTM E413-16, Classification for Rating Sound Insulation
  - .5 ASTM F1667-18a, Standard Specification for Driven Fasteners: Nails, Spikes, and Staples
- .2 CSA Group (CSA):
  - .1 CSA B111-1974, Wire Nails, Spikes and Staples
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS):
  - .1 Safety Data Sheets (SDS)
- .4 Underwriters Laboratories of Canada (ULC):
  - .1 ULC 102-18, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies (CAN/ULC S102)
  - .2 ULC 114-18, Standard Method of Test for Determination of Non-Combustibility in Building Materials

### **1.04 ADMINISTRATIVE REQUIREMENTS**

- .1 N/A

### **1.05 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: Submit manufacturer's instructions, product literature and data sheets for blanket insulation. Include product characteristics, performance criteria, physical sizes, and limitations.
- .3 Certificates: When requested, submit manufacturer's product certificates certifying materials comply with specified performance characteristics and criteria and physical requirements.

- .4 Test Reports: When requested, submit certified test reports showing compliance with specified performance characteristics and physical properties.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- .1 Perform in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Storage and Handling Requirements:
  - .1 Store materials off ground, indoors, in a clean dry location and in accordance with manufacturer's recommendations.

### **2 PRODUCTS**

#### **2.01 INSULATION**

- .1 Fibrous Glass Acoustical Insulation: Un-faced, to ASTM C423, ASTM E90, ASTM E413, and ULC S702.
  - .1 Type: For use specifically with metal framing.
  - .2 Thickness:
    - .1 89 mm in 92 mm (3 5/8") metal studs
    - .2 138 mm in 152 (6") metal studs

#### **2.02 ACCESSORIES**

- .1 Insulation clips:
  - .1 Impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, adhesive back, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self locking type.
- .2 Nails: galvanized steel, length to suit insulation plus 25 mm, to F1667, CSA B111.
- .3 Staples: minimum 12 mm leg.
- .4 Tape: as recommended by manufacturer.

### **3 EXECUTION**

#### **3.01 EXAMINATION**

- .1 Verification of Conditions: Verify that conditions of substrate previously installed are acceptable for blanket insulation application in accordance with manufacturer's instructions.
  - .1 Verify all in wall construction is complete.
  - .2 Verify building substrates are dry.
  - .3 Inform Consultant of unacceptable conditions immediately upon discovery.
  - .4 Proceed with installation only after unacceptable conditions have been remedied.

**3.02 INSULATION INSTALLATION**

- .1 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
- .2 Fill stud space of framed walls with insulation full depth of stud.
- .3 Do not compress insulation to fit into spaces.
- .4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures.
- .5 Do not enclose insulation until it has been reviewed and is acceptable by Consultant.

**END OF SECTION**

## **1 GENERAL**

### **1.01 SUMMARY**

- .1 This Section specifies fire stop and smoke seal systems and materials intended to fill gaps between fire separations, between fire separations and other construction assemblies, or used in or around items which fully or partially penetrate a fire separation, to restrict the spread of fire and smoke thus maintaining the integrity of a fire separation.
- .2 This Section includes requirements for:
  - .1 Through-penetration fire stops:
    - .1 For openings created to allow a penetrating item such as piping, conduits, raceways, ducts, cable trays, cables, tubing or structural components to pass completely through a fire separation or fire-resistance rated assembly.
  - .2 Membrane penetration fire stops:
    - .1 For openings where penetrating items such as piping, conduits, raceways, ducts, cable trays, cables, tubing, recessed components (e.g., panels, electric boxes, devices) or structural components pass through only one membrane of a fire separation or fire-resistance rated assembly.
  - .3 Blank opening fire stops:
    - .1 For openings created in a fire separation where the penetrating item has not yet been installed or has been removed.
- .3 This Section includes firestopping associated with new penetrations and remediation of existing penetrations within areas affected by the Work.

### **1.02 RELATED REQUIREMENTS**

- .1 N/A

### **1.03 DEFINITIONS**

- .1 Fire Stop: material, component or system, and its means of support, used to protect gaps between fire separations, between fire separations and other construction assemblies, or used in openings where penetrating items wholly or partially penetrate fire separations, to restrict the spread of fire and smoke thus maintaining the fire-resistance continuity of a fire separation.
- .2 Fire Stop System: a specific site erected construction consisting of the assembly, fire stop materials, any penetrating items and their means of support which have met the requirements for an F, FT, FH, FTH and/or L rating when tested in a fire-resistance rated assembly in accordance with CAN/ULC-S115.
  - .1 F-Rating: the amount of time a fire stop system can remain in place without the passage of flame through the opening or the occurrence of flaming on the unexposed face of the fire stop.
  - .2 FT-Rating: a fire stop system with an F-Rating for the required time period which can also resist the transmission of heat through the fire stop during the same period and limit the rise in temperature on the unexposed face and/or penetrating item of the fire stop.



#### 1.04 REFERENCE STANDARDS

- .1 ULC Standards (ULC):
  - .1 CAN/ULC-S101, Standard Method of Fire Endurance Tests of Building Construction and Materials
  - .2 CAN/ULC-S115, Standard Method of Fire Tests of Firestop Systems

#### 1.05 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's product data for each type of fire stopping and smoke seal. Submit complete product data for each individual component and include:
    - .1 Product name and product number
    - .2 Product characteristics and performance criteria
    - .3 Physical size, finish and limitations
    - .4 Curing time
    - .5 Chemical compatibility to other construction materials
    - .6 Associated ULC Assembly System Design Listing Name / Number
    - .7 Associated ULC Assembly Product Data
  - .2 Manufacture Product Certification:
    - .1 Submit manufacturer certification certifying products supplied comply with local regulations controlling use of Volatile Organic Compounds (VOC's) and are non-toxic to building occupants.
  - .3 Submit one copy of WHMIS Safety Data Sheets (SDS) for each individual component.
  - .4 Submit a comprehensive list of all products and components included in submittal.
- .3 Shop Drawings:
  - .1 Submit system design listings and installation details for each penetration type.
- .4 Closeout Submittals:
  - .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .5 Operation and Maintenance Data: Submit maintenance data for incorporation into manual, including:
  - .1 WHMIS Safety Data Sheets (SDS),
  - .2 product data and manufacturer's installation and maintenance instructions for each product/system used on this project,
  - .3 Warranty information on fire stop installations.
    - .1 Identify each penetration type fire stop with their penetration identification number.

- .4 Provide detailed Drawings of system design listings for each type of fire stop (i.e., through-penetration, membrane penetration, blank opening, construction joint, building perimeter).
- .5 Fire Stop Schedules:
  - .1 Submit complete fire stop schedules for floors, walls and ceilings.
  - .2 Indicate all penetration fire stops and joint fire stops through each reference wall, floor and ceiling in the schedules.
  - .3 Cross-reference firestop schedules with as-built drawings and indicate design listing numbers associated to each penetration fire stop and joint fire stop.

#### **1.06 QUALITY ASSURANCE**

- .1 Regulatory Requirements: Use materials and methods of determining required thickness of application that have the full acceptance of AHJ and that are tested in accordance with CAN/ULC-S115, and form a part of a ULC or cUL listed system.
- .2 Qualifications:
  - .1 Contractor specializing in selection and installation of fire stops with five years documented experience and approved by manufacturer. Submit a list of five successfully completed projects of similar scale and type if requested by Consultant.
  - .2 Installer shall be qualified and experienced in installation of firestop systems in accordance with manufacturer's requirements.
  - .3 Certified Firestop Contractor: company certified with one of the following programs:
    - .1 ULC Qualified Firestop Contractor Program. Submit signed copy of certificate.

#### **1.07 DELIVERY, STORAGE AND HANDLING**

- .1 Packing, shipping, handling and unloading:
  - .1 Perform in accordance with Section 01 61 00 - Common Product Requirements.
  - .2 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, ULC markings, manufacturing date, shelf life expiry date.
- .2 Storage and Protection:
  - .1 Store materials in a well-ventilated, dry indoor location and in accordance with manufacturer's instructions.
  - .2 Coordinate delivery of materials with scheduled installation dates to allow minimum storage time on site.
  - .3 Comply with recommended procedures, precautions and measures described in WHMIS Safety Data Sheets (SDS).

## **1.08 AMBIENT CONDITIONS**

- .1 Ambient Conditions:
  - .1 Install fire stops and smoke seals when ambient and substrate temperatures are within the limits prescribed by the manufacturer and when the substrate is dry and without risk of condensation.
  - .2 Maintain manufacturer's recommended ambient and substrate temperatures for forty-eight (48) hours before and seventy-two (72) hours after installation.
- .2 Ventilate fire stops and smoke seals in accordance with manufacturers' instructions by natural means or, where this is inadequate or not available, use forced air circulation.

## **1.09 WARRANTY**

- .1 Extend warranty period to two (2) years for Work of this Section.
- .2 Manufacturers shall warrant work of this Section against defects and deficiencies in the product material for a period of two (2) years. Promptly correct any defects or deficiencies which become apparent within warranty period at no expense.
- .3 Contractor warrants workmanship on materials and installation for a period of two (2) years. Promptly correct any defects or deficiencies which become apparent within warranty period at no expense.

## **2 PRODUCTS**

### **2.01 MANUFACTURERS**

- .1 Provide products from a single manufacturer, to the greatest extent possible, to perform all fire stopping work. Materials of different manufacturers will not be permitted without authorization from Consultant.
- .2 Provide a listed system from an alternative where there is no specific tested listed fire stop system available from the manufacturer for a particular fire stopping application to avoid providing an Engineering Judgment.

### **2.02 PERFORMANCE/DESIGN CRITERIA**

- .1 Fire stop and smoke seal systems consisting of a material or combination of materials installed to maintain the integrity of the fire-resistance rating of a fire separation in accordance with the requirements of the Ontario Building Code (OBC) and Authorities Having Jurisdiction (AHJ).
- .2 Performance Requirements: Manufacturer shall design proprietary assemblies to withstand the listed ratings in accordance with the OBC, ULC Standards, and AHJ, and as follows:
  - .1 Provide through-penetration fire stop and joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of penetrated assembly, such as:
    - .1 Fire-resistance rated loadbearing walls, including partitions, with fire protection rated openings.

- .2 Fire-resistance rated non-loadbearing walls, including partitions with fire protection rated openings.
- .3 Fire-resistance rated floor assemblies.
- .2 "F" Rated Systems: Provide through-penetration fire stop systems with F-ratings indicated, as determined by CAN/ULC-S115 or ASTM E814, and equal to or exceeding the fire-resistance rating of the penetrations created during construction.
- .3 Fire stopping and Smoke Seal Systems Exposed to View: Provide products that after curing do not deteriorate when exposed to view, traffic, moisture, and physical damage both during and after construction, and as follows:
  - .1 Provide moisture resistant through-penetration fire stop systems for piping penetrations for plumbing and wet pipe sprinkler systems.
  - .2 Provide fire stopping and smoke seal systems capable of supporting anticipated floor loads either by installing floor plates or by other means for floor penetrations with annular spaces exceeding one-hundred (100) mm in width and exposed to possible loading and traffic.
  - .3 Provide fire stopping and smoke seal systems not requiring removal of insulation for penetrations involving insulated piping.
  - .4 Provide products with flame-spread ratings of less than twenty-five (25) and smoke-developed ratings of less than fifty (50) for fire stopping, smoke seal, and joint systems exposed to view.
  - .5 Architectural considerations: When fire stop system is exposed to view, consider architectural finish, potential traffic, and exposure to moisture and heat.
- .3 Insulated Pipes and Ducts: Design and test listed fire stop system with the actual insulation materials penetrating the fire separation, as indicated on the system design listing.
- .4 Use in Wet Areas: water-based products are unacceptable in wet areas or areas that may be subject to occasional water exposure or flooding during and after construction.

## 2.03 MATERIALS

- .1 Compatibility: Under conditions of service and application, provide fire stopping and smoke seal systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating the systems, as demonstrated by fire stopping and smoke seal system manufacturer based on testing and site experience, and as follows:
  - .1 Asbestos-free materials and systems capable of maintaining an effective barrier against the passage of flame, smoke and water and the transmission of heat in compliance with requirements of CAN-ULC-S115 and not to exceed opening sizes for which they are intended, as indicated on System Design Listing.
  - .2 Fire Stop System Rating: To match fire-resistance rating of fire separation as indicated on Drawings and in schedule.
  - .3 Service penetration assemblies and fire stop components: Certified by testing laboratory to CAN/ULC-S115.

- .4 Provide elastomeric protection for fire and smoke stop systems at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control. Do not use a cementitious or rigid seal at such locations. Exemption for fire dampers.
- .5 Provide elastomeric seal for fire and smoke seals behind and around mechanical and electrical boxes within wall, floor, and ceiling assemblies.

## **2.04 FILL MATERIALS**

- .1 General:
  - .1 Fire stopping and smoke seal systems shall be tested in accordance with CAN/ULC-S115 and be comprised of asbestos free materials and systems capable of maintaining an effective barrier against flame, smoke and gases. Fire stopping and smoke seal systems not to exceed opening sizes for which they are intended for the ratings as indicated on Drawings.
- .2 Latex Sealants: Single component latex formulations that after curing do not re-emulsify during exposure to moisture.
- .3 Fire Stopping and Smoke Seal Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrating item.
- .4 Cable Penetration Devices:
  - .1 Pre-manufactured intumescent blocks
  - .2 Pre-manufactured sleeves, consisting of an adjustable core
  - .3 Pre-manufactured cable management system, consisting of a system of intumescent inserts and adjustable cores
- .5 Intumescent Putties: Non-hardening dielectric, water resistant putties containing no solvents, inorganic fibres, or silicone compounds.
- .6 Intumescent Spray Foam: Expanding spray-in-place intumescent foam sealant.
- .7 Intumescent Wrap Strips: Single component intumescent elastomeric sheets with aluminum foil on one side.

## **2.05 MIXING**

- .1 For those products requiring mixing before application, comply with fire stopping and smoke seal system manufacturer's instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

## **2.06 ACCESSORIES**

- .1 Provide components for each fire stopping and smoke seal system needed to install fill materials. Use only components specified by fire stopping and smoke seal system manufacturer and approved by the qualified testing and inspecting agency for fire stopping and smoke seal systems indicated on Drawings.
- .2 Primers: To manufacturer's recommendation for specific material, substrate, and end use.

- .3 Fire Stop Insulation: Pre-formed, semi-rigid, non-combustible mineral wool.
- .4 Junction Box/Outlet Sealing Putty: Intumescent putty, pre-formed in pads.
- .5 Sealants: Good adhesion without use of primer
  - .1 Flame-spread rating: Maximum 25
  - .2 Smoke development classification: Maximum 50
  - .3 For vertical joints: Non-sagging
  - .4 For horizontal joints: Single component, self-levelling

### **3 EXECUTION**

#### **3.01 EXAMINATION**

- .1 Verify that conditions of substrates previously installed are acceptable for product installation in accordance with manufacturer's instructions and approved system design listings for each condition.
- .2 Verify each opening/annular space to ensure it does not exceed the maximum and minimum dimensions indicated on the approved system design listing.
- .3 Verify that all joints, service penetrating elements and supporting devices/hangers have been properly installed as indicated on approved system design listings. Remove all temporary lines and markings to meet the approved system design listings.
- .4 Verify that proposed fire stop system consists of components that are compatible with each other, with substrates forming the openings, and with items, if any, penetrating the fire stop under conditions of application and service, as demonstrated by the fire stop manufacturer based on testing and site experience.
- .5 Pipe and Duct Insulation: Confirm that proposed fire stop system has been tested with the actual insulation penetrating the fire separation on site, as indicated in the approved system design listing. Maintain insulation around pipes and ducts penetrating the fire separation.
- .6 Ensure no additional items have been installed through opening that does not appear on the approved system design listing.
- .7 Ensure fire stopped areas are accessible for proper application and that conditions are suitable for installation of the fire stop system. Areas to remain accessible for inspection.
- .8 Report in writing to Consultant any defective surfaces or conditions affecting the fire stop system installation immediately and before commencing any installations.
- .9 Proceed only once defected surfaces or conditions have been corrected.
- .10 Proceed with installation only after unacceptable conditions have been remedied.

#### **3.02 PREPARATION**

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.
  - .1 Ensure that substrates and surfaces are clean, dry and frost free.

- .2 Ensure substrates and surfaces are free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
- .2 Prepare surfaces in contact with fire stop and smoke stop materials to manufacturer's instructions.
- .3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.
- .4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.
- .5 Protect adjacent work areas and finish surfaces from damage during product installation.
- .6 Prime surfaces as required.
- .7 Ensure multi-penetration openings have been framed and boarded out around annular openings, as indicated in the system design listing before prepping the opening.

### **3.03 INSTALLATION**

- .1 Install fire stop and smoke seal materials and components in accordance with manufacturer's certified tested system listing.
- .2 Coordinate with other sub-trades to ensure that all pipes, conduits, cables, and other items, which penetrate fire separations, have been permanently installed before installation of fire stop systems.
- .3 Schedule work to ensure that fire separations and all other construction that conceals penetrations are not erected before installation of fire and smoke seal systems
- .4 Seal holes or voids made by through-penetrations, poke-through termination devices, and un-penetrated openings or joints to ensure that both continuity and integrity of fire separation are maintained.
- .5 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing per manufacturer's instructions.
- .6 Tool or trowel exposed surfaces to neat finish.
- .7 Remove excess compound promptly as work progresses and upon completion.
- .8 Protect gaps around recessed components (e.g., panels, electrical boxes, outlets) with sealing putty in accordance with manufacturer's instructions.
- .9 Do not use damaged or expired material.

### **3.04 INSTALLATION – THROUGH PENETRATION JOINT SEALANTS**

- .1 Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position required to achieve fire ratings of designated through-penetration fire stop systems.
- .2 Install fill materials for through-penetration fire stop systems by techniques recommended by the manufacturer to produce the following results:
  - .1 Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.

- .2 Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
- .3 For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.
- .3 Remove combustible forming materials and other accessories not indicated as permanent components of fire stop systems.

### **3.05 REPAIRS AND MODIFICATIONS**

- .1 Identify damaged or re-entered seals requiring repair or modification.
- .2 Remove loose or damaged materials. If adding penetrating items, remove sufficient material to insert new elements and to avoid damaging the balance of the seal.
- .3 Ensure sealed surfaces are clean and dry.
- .4 Use only materials that are suitable for repair of original seal, as approved by manufacturer. Do not mix products from different manufacturers.

### **3.06 SITE QUALITY CONTROL**

- .1 Inspections: Notify Consultant and AHJ when ready for inspection and before concealing or enclosing fire stop materials and service penetration assemblies.

### **3.07 INSPECTIONS**

- .1 Owner and Consultant to conduct random inspections and direct exploratory review the course of construction and before closing off any concealed areas. Perform inspections and destructive testing in compliance with ASTM E2174 and ASTM E2393.
- .2 Upon completion of construction and before requesting substantial performance review, fire stop contractor and manufacturer's representative shall inspect all fire stopping work and prepare a deficiency list. Submit deficiency list to Consultant for review. Repair any deficiencies and re-inspect work to ensure that all deficiencies have been completed.
- .3 Submit formal request for substantial performance review of work once all work is completed, quality control has been performed, and all fire stop installations have been inspected.

### **3.08 CLEANING**

- .1 Perform cleaning in accordance with Section 01 74 00 - Cleaning.
- .2 Remove equipment, excess materials and debris and clean adjacent surfaces immediately after application. Use methods and cleaning materials approved by manufacturer.
- .3 Protect fire stops during and after curing period from contact with contaminating substances
- .4 Remove temporary dams after initial set of fire stop and smoke seal materials.

### **3.09 SCHEDULE**

Provide firestopping systems appropriate to penetration type using ULC listed systems. Typical systems include:



- .1 Intumescent sealants
- .2 Mineral wool with sealant
- .3 Firestop collars for non-metallic piping
- .4 Firestop foam where permitted
- .5 Pre-manufactured cable management systems (Hilti, Roxtec, EZ-Path, or approved equivalent)

**END OF SECTION**

## **1 GENERAL**

### **1.01 SUMMARY**

- .1 Section includes:
  - .1 interior joint sealants

### **1.02 RELATED REQUIREMENTS**

- .1 Section 07 84 00 – Firestopping
- .2 Section 09 21 16 – Gypsum Board Assemblies
- .3 Section 09 30 13 – Ceramic Tiling

### **1.03 DEFINITIONS**

- .1 N/A

### **1.04 REFERENCE STANDARDS**

- .1 ASTM International (ASTM):
  - .1 ASTM C881/C881M-20a, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
  - .2 ASTM C919-24, Standard Practice for Use of Sealants in Acoustical Applications
  - .3 ASTM C920-18, Standard Specification for Elastomeric Joint Sealants
  - .4 ASTM C1193-16, Standard Guide for Use of Joint Sealants
  - .5 ASTM C1330-18, Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants
  - .6 ASTM D1056-20, Standard Specification for Flexible Cellular Materials—Sponge or Expanded Rubber

### **1.05 ADMINISTRATIVE REQUIREMENTS**

- .1 N/A

### **1.06 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product data: Product literature and data sheets, including product characteristics, performance criteria, physical sizes, finishes, WHMIS SDSs, example warranty documentation, and limitations.
  - .1 Submit product data for:
    - .1 primers
    - .2 sealants
    - .3 backer rod
- .3 Certificates: When requested by the Consultant, submit manufacturer's product certificates indicating proposed sealant is appropriate for each application.

- .4 Manufacturer's instructions:
  - .1 Special delivery, storage, and handling requirements.
  - .2 Application instructions.
  - .3 Recommended sequencing.
  - .4 Cleaning procedures.

#### **1.07 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and maintenance data:
  - .1 Include, in the operation and maintenance manual, manufacturer's maintenance instructions and recommended cleaning materials and methods.

#### **1.08 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Manufacturers:
    - .1 Obtain each type of joint sealant from a single manufacturer.
- .2 Mock-ups: Erect in accordance with Section 01 43 00 - Quality Assurance.
  - .1 Acoustic Sealant:
    - .1 Before performing all acoustic sealant work, apply sample for review. Sample to be made up of sealant under stud and at each layer of gypsum board. Install gypsum board only on one side of stud for mock-up to allow for visual inspection from rear into the stud cavity.
    - .2 Location: Acceptable to Consultant to demonstrate all unique installation types (wall, ceiling and floor).

#### **1.09 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements, and:
  - .1 Storage and handling requirements:
    - .1 Handle and dispose of hazardous materials in accordance with the Canadian Environmental Protection Act (CEPA), Transportation of Dangerous Goods Act (TDGA), and regional and municipal regulations.
    - .2 Do not dispose of unused sealant material into sewer system, streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
    - .3 Divert unused joint sealing material from landfill to official hazardous material collections site acceptable to Authority Having Jurisdiction (AHJ).

## 1.10 SITE CONDITIONS

- .1 Proceed with installation of joint sealants when:
  - .1 ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 4.4 °C;
  - .2 joint substrates are dry; and
  - .3 conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

## 1.11 WARRANTY

- .1 Manufacturer's warranty: Manufacturer's standard warranty document, executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights the Owner may have under the Contract.
  - .1 Warrant that sealant work will not leak, crack, crumble, melt, shrink, run, lose adhesion, or stain adjacent surfaces in accordance with General Conditions, except for five (5) years.
- .2 Installer's warranty: Provide an installation warranty; installer agrees to repair or replace joint sealants that do not comply with requirements of this section for two (2) years from Substantial Performance of the Work.

## 2 PRODUCTS

### 2.01 PERFORMANCE CRITERIA

- .1 Each sealant system shall meet the following requirements for warranty period:
  - .1 Waterproof, flexible, and compatible with substrate under applicable service conditions.
  - .2 Provide a weather-tight seal that does not allow moisture penetration.
  - .3 Shall not de-bond, crack, or craze.
  - .4 Shall not leak.
- .2 Compatibility: Ensure sealants are compatible with adjacent materials and are approved by manufacture for use with adjacent materials.

### 2.02 SEALANT MATERIALS

- .1 In air handling units and supply air system, use mould-resistant sealants without strong odours or toxic chemicals.
- .2 Provide primers in accordance with manufacturer recommendation.

### 2.03 SEALANT MATERIAL DESIGNATIONS

- .1 Type S-1: Acrylic latex; one-part, Shore A Hardness of 20, to CGSB 19-GP-5M, solvent cure, CAN/CGSB-19.17-M emulsion base.

- .2 Type S-2: Silicone sealant; mould- and mildew-resistant.
  - .1 To ASTM C920, CAN/CGSB-19.13-M, type S; grade NS; class 25 or 50 as recommended by Manufacturer; use NT, G, and A.
- .3 Type S-3: Silicone sealant; general construction and air-seal sealant.
  - .1 To ASTM C920, type S; grade NS; class 25; use NT, M, G, A, O.
- .4 Type S-5: Acoustical sealant; to ASTM C919, interior, non-skimming, non-hardening, simple component synthetic rubber sealant.
- .5 Type S-7: Polyurethane sealant, one-component; non-sag, for general construction.
  - .1 To ASTM C920, CAN/CGSB-19.24, type S; grade NS; class 25; use NT, M, A, O.
- .6 Type S-9: Low modulus polyurethane sealant, one component; moisture curing for sealing joints in level and slightly sloped surfaces.
  - .1 To ASTM C920, CAN/CGSB-19.24, type S, grade P, class 50, use T, M, A, O, MC-1-25-B-N.
- .7 Type S-10: Control joint sealant, two-component; epoxy-urethane, self-levelling, load bearing saw cut or preformed control joints.

## 2.04 ACCESSORIES

- .1 Preformed compressible and non-compressible back-up materials that are non-staining, compatible with joint substrate, sealants, primers, and other joint fillers, and are acceptable for applications indicated by sealant manufacturer, based on site experience and laboratory testing:
  - .1 Rod type sealant backings:
    - .1 ASTM C1330, Type C (closed cell material with a surface skin), Type O (open cell material) or Type B (bicellular material with a surface skin).
    - .2 Provide any of the preceding types, as approved in writing by joint sealant manufacturer for joint application indicated.
    - .3 Size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
    - .4 Non-adhering to sealant, to maintain two-sided adhesion across joint.
  - .2 High density foam:
    - .1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m<sup>3</sup> density, or neoprene foam backer, compatible with sealant and primer, non-adhering to sealant. Size as recommended by manufacturer.
  - .3 Elastomeric tubing joint fillers:
    - .1 Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D1056, non-absorbent to water and gas, capable of remaining resilient at temperatures down to 15 °C, 6 mm minimum thick wall, outsized 30 to 50%. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth and otherwise contribute to optimum sealant performance.

- .2 Preformed sealants:
  - .1 Preformed silicone sealant system: Manufacturer's standard system consisting of pre-cured low modulus silicone extrusion, in sizes to fit joint widths indicated, combined with a neutral curing silicone sealant for bonding extrusions to substrates.
  - .2 Preformed hollow neoprene gasket: Manufacturer's standard preformed polychloroprene elastomeric joint seal of the open cell compression type complying with ASTM D2628 and with requirements for size, profile and cross-sectional design.
- .3 Joint cleaners: Non-corrosive and non-staining types, compatible with joint forming materials and sealant in accordance with sealant manufacturer's recommendations.
- .4 Primer: Non-staining type in accordance with sealant manufacturer's recommendations.
- .5 Masking tape: Non-absorbent type, non-staining, compatible with joint sealant and joint substrates.

## **2.05 COLOURS**

- .1 Sealant colours: Match colour of adjacent materials where visible, as selected by the Consultant from manufacturer's samples.

## **3 EXECUTION**

### **3.01 EXAMINATION**

- .1 Verification of conditions:
  - .1 Verify substrate and project conditions in accordance with Section 01 71 00 - Examination and Preparation, and:
    - .1 Verify joint surfaces are dry and frost free.
    - .2 Verify substrates are without contaminants capable of interfering with sealant adhesion. Remove contaminants where occurring.
    - .3 Examine joint sizes and conditions to establish acceptable depth to width ratio for installation of backup materials and application of sealants.
    - .4 Verify joint widths are within the limits recommended by joint sealant manufacturer for applications indicated.

### **3.02 PREPARATION**

- .1 Surface preparation:
  - .1 Prepare surfaces in accordance with manufacturer's instructions.
  - .2 Clean bonding joint surfaces of harmful contaminants including dust, rust, oil grease, and other matter which may impair adhesion.
  - .3 Do not apply sealants to joint substrates treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

### 3.03 PRIMING

- .1 Mask adjacent surfaces prior to priming and sealing where necessary to prevent staining.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately applying sealant, except when manufacturer's instructions explicitly state priming is not required.
- .3 Prime porous materials (including wood, masonry, concrete, ceramic or paver tiles, etc.).

### 3.04 BACKUP MATERIAL INSTALLATION

- .1 Provide backer rod as specified, to limit depth of sealant and to act as bond breaker at back of joint.
- .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.
- .3 Apply paper masking tape to back of joint to act as bond break where depth of joint does not permit the use of backer rod.
- .4 Ensure that no joints are formed which are bonded on adjacent sides where there is any possibility of movement.

### 3.05 MIXING

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

### 3.06 APPLICATION

- .1 Apply sealants in accordance with ASTM C1193, and in accordance with manufacturer's instructions, and:
  - .1 Apply sealant within recommended temperature ranges. Consult manufacturer when sealant cannot be applied within recommended temperature range.
  - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
  - .3 For joints where movement is possible, apply backer rod to achieve a joint depth of one half the joint width but not less than nine (9) mm; for joints larger than twenty-five (25) mm use a depth of thirteen (13) mm.
  - .4 Apply sealant in continuous beads.
  - .5 Apply sealant using gun with proper size nozzle.
  - .6 Fill voids and joints solid.
  - .7 Form sealant surface with a smooth full bead, without ridges, wrinkles, sags, air pockets, embedded impurities.
  - .8 Tool exposed surfaces before skinning begins to give slightly concave shape.
  - .9 Ensure bead is solid, filling entire space between sides and bedding material, exerting sufficient pressure to obtain maximum bond, by allowing sealant to bulge out in advance of nozzle.
  - .10 Apply sealant within recommended temperature ranges. Consult manufacturer when sealant cannot be applied within recommended temperature range.

- .11 Seal locations where dissimilar materials meet.
- .2 Sealant curing:
  - .1 Cure sealants in accordance with sealant manufacturer's instructions.
  - .2 Do not cover up sealants until after curing has completed.

### 3.07 SITE QUALITY CONTROL

- .1 Document via photographs and/or videos all acoustic sealant installation during course of project. Format into a pdf or shared digital folder with room number identification for locations of photographs / videos and share with Consultant at completion of acoustic sealant installation for records and review.

### 3.08 CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning, and:
  - .1 Clean adjacent surfaces immediately of excess primers and sealants.
  - .2 Remove excess and droppings, using recommended cleaners as work progresses.
  - .3 Remove masking tape after initial set of sealants.
- .2 Waste management:
  - .1 Do not dispose of unused sealant materials into sewer system, streams, lakes, onto ground, or other location where it might pose a health or environmental hazard.
  - .2 Divert unused sealants from landfill to a hazardous material collection site.
  - .3 Place materials defined as hazardous or toxic in designated containers.
  - .4 Dispose of hazardous materials in accordance with the CEPA, TDGA, and regional and municipal regulations.

### 3.09 SCHEDULE

- .1 Use acrylic sealant Type S-1 only on the interior and only where little or no movement can occur.
- .2 Use mould and mildew-resistant silicone sealant Type S-2 for non-moving joints in washrooms and kitchens. Do not use on floors.
- .3 Use silicone general construction sealant Type S-3 or Type S-6 and Type S-7 for all joints, interior and exterior, where no other specific sealant type is specified.
- .4 Use acoustical sealant Type S-5 only where it will be fully concealed and only where no constant or consistent air pressure difference will exist across the joint.
- .5 Use polyurethane, semi-self-levelling sealant Type S-9 for in expansion joints in sidewalks, plazas, floors and other pedestrian and vehicular horizontal surfaces with slopes up to 6%.
- .6 Use control joint sealant Type S-10 as filler for interior, horizontal saw cut or preformed control joints where joints are subject to load bearing conditions.
- .7 Seal perimeters of hollow metal door frames on both sides.



- .8 Seal control joints in gypsum board, except where prefabricated control joints are specified.
- .9 Seal junctures between interior partitions with exterior walls.
- .10 Seal window and door frames around the inside perimeter, so that an airtight seal is obtained.
- .11 Seal joints in floors and walls and around service and mechanical and electrical fixture penetrations.
- .12 Perimeter of bath fixtures (sinks, urinals, water closets, vanities, etc.).
- .13 Seal interior perimeters of exterior openings.
- .14 Interior control and expansion joints in floor surfaces.
- .15 Perimeters of interior frames.
- .16 Movement, control, and expansion joints in interior surfaces of unit masonry walls.
- .17 Joints at tops of non-load bearing masonry walls at the underside of poured concrete.
- .18 Seal locations where dissimilar materials meet.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 07 92 00 - Joint Sealants
- .2 Section 08 71 00 - Door Hardware
- .3 Section 09 91 23 - Interior Painting

### **1.02 DEFINITIONS**

- .1 N/A

### **1.03 REFERENCE STANDARDS**

- .1 ASTM International (ASTM):
  - .1 ASTM A653/A653M-18, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  - .2 ASTM A780/A780M-20, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
  - .3 ASTM A924/A924M-22a, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
  - .4 ASTM E90-09, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
- .2 CSA Group (CSA):
  - .1 AAMA/WDMA/CSA 101/I.S.2/A440-17, North American Fenestration Standard/Specification for windows, doors, and skylights
  - .2 CSA A440S1:19, Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440-11, North American Fenestration Standard/Specification for windows, doors, and skylights
  - .3 CSA G40.20-13 /G40.21-13, General requirements for rolled or welded structural quality steel/Structural quality steel
  - .4 CSA W47.1:19, Certification of companies for fusion welding of steel
  - .5 CSA W59:24, Welded steel construction
- .3 Canadian Steel Door Manufacturers Association (CSDMA):
  - .1 Guide Specification for Installation and Storage of Hollow Metal Doors and Frames, 2012
  - .2 Recommended Specifications for Commercial Steel Door and Frame Products, 2022
- .4 Master Painters Institute (MPI):
  - .1 Approved Products List (APL), online edition
- .5 Steel Door Institute (SDI):
  - .1 SDI 108-10, Recommended Selection and Usage Guide for Standard Steel Doors

- .2 SDI 111-24, Recommended Details for Standard Steel Doors, Frames, Accessories and Related Components
- .3 SDI 122-21, Installation Troubleshooting Guide for Standard Steel Doors and Frames

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination:
  - .1 Coordinate with Section 08 71 00 - Door Hardware for:
    - .1 manufacturers' door hardware templates
    - .2 reinforcement required to secure hardware

#### **1.05 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product data: Product literature and data sheets for each type of door and frame, including product characteristics, performance criteria, physical sizes, finishes, core descriptions, and limitations.
- .3 Shop drawings:
  - .1 For each type of door, indicate materials, steel core thicknesses, mortises, reinforcements, locations of exposed fasteners, openings, louvres, hardware arrangements, and finishes.
  - .2 For each type of frame, indicate materials, core metal thicknesses, reinforcements, locations of anchors and exposed fastenings, and finishes.
  - .3 Include a Schedule identifying each unit with door marks and numbers matching numbering on Drawings and Door Schedule.

#### **1.06 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and maintenance data:
  - .1 Include, in the operation and maintenance manual, manufacturer's maintenance instructions and recommended cleaning materials and methods.

#### **1.07 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Installers:
    - .1 Installers performing on-site steel welding: Certified by the Canadian Welding Bureau to CSA W47.1.

#### **1.08 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements, and:
  - .1 Comply with CSDMA's Guide Specification for Installation and Storage of Hollow Metal Doors and Frames.

## 1.09 WARRANTY

- .1 Submit warranty information in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Manufacturer warranty: Manufacturer's standard warranty document, executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights the Owner may have under the Contract.
  - .1 Manufacturer's warranty period: 10 years minimum.

## 2 PRODUCTS

### 2.01 HOLLOW METAL DOOR AND FRAMES

- .1 Standard Door and Frame Manufacturers:
  - .1 Provide doors and frames from a single manufacturer.

### 2.02 MATERIALS

- .1 Metals:
  - .1 Description:
    - .1 Steel sheet for interior doors and frames: To ASTM A653/A653M, commercial steel (CS), Type B, stretcher levelled standard of flatness where used for face sheets.
      - .1 Base metal thicknesses:
        - .1 Frames: 1.70 mm.
        - .2 Doors: 1.34 mm.
      - .2 Galvannealed coating designations:
        - .1 Typical: ZF75.
    - .2 Reinforcement channels: To CSA G40.20/G40.21, Grade 300W, with ZF75 galvannealed coating designation in accordance with ASTM A653/653M.
- .2 Door core materials:
  - .1 Honeycomb: Structural maximum 25 mm small cell kraft paper, minimum 36 kg weight per ream, minimum 16.5 kg/ cubic metre (m<sup>3</sup>) density, and sanded to required thickness.
- .3 Adhesives:
  - .1 Types:
    - .1 Honeycomb core and steel component adhesive: Heat-resistant, spray-grade polyurethane or resin-reinforced polychloroprene.
    - .2 Lock-seam edge adhesive: Fire-resistant, resin-reinforced polychloroprene, high viscosity, sealant/adhesive.
- .4 Floor anchors and channel spreaders: 1.70 -mm-thick steel tee anchors, 1.34 -mm-wall stud anchors, and provide anchors appropriate to site conditions, as follows:
  - .1 Interior locations: Wipe coat galvanized.

- .2 Drilled stud anchors for wire tie to studs.

## **2.03 FRAME FABRICATION**

- .1 Fabricate door frames in accordance with CSDMA's Recommended Specifications for Commercial Steel Door and Frame Products, SDI 111.
- .2 Fabricate frames to profiles and maximum face sizes as indicated on Drawings. Coordinate throat dimensions based on actual material used for adjacent wall and partition construction assemblies.
- .3 Cut mitres accurately and weld, secure bent tabs on inside of frame profile.
- .4 Reinforce head of frames wider than 1200 mm with 2.5 mm formed steel channel welded in place, flush with top of frame.
- .5 Interior frame construction: Welded type.
- .6 Blank, reinforce, drill, and tap frames for mortised, templated hardware. Use templates provided by door hardware suppliers. Reinforce frames for surface-mounted hardware.
- .7 Protect mortised cut-outs with steel guard boxes.
- .8 Prepare door openings for door silencers:
  - .1 Three silencers on strike jamb for single door openings.
  - .2 Two silencers on heads for double door openings.
- .9 Manufacturer's nameplates on frames and screens are not acceptable.
- .10 Conceal fasteners.
- .11 Touch up areas where zinc coating has been removed during fabrication with shop-applied primer.
- .12 Frame anchorage:
  - .1 Provide concealed anchorage to floor and wall construction.
  - .2 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.
  - .3 Provide two anchors for rebate opening heights up to 1520 mm, and one additional anchor for each additional 760 mm of height or fraction thereof.
  - .4 Locate anchors for frames in previously placed masonry maximum 150 mm from top and bottom of each jamb, and intermediate anchors at maximum 660 mm on-centre.

## **2.04 WELDED TYPE FRAME FABRICATION**

- .1 Perform welding to CSA WS59.
- .2 Accurately mitre or mechanically joint frame products. Securely weld on inside of profile.
- .3 Cope accurately and securely weld butt joints of mullions, transom bars, centre rails, and sills.
- .4 Grind welded joints and corners flat, fill with metallic paste filler, and sand to uniform smooth finish.
- .5 Securely attach floor anchors to inside of each jamb profile.

- .6 Weld in two temporary jamb spreaders per frame to maintain proper alignment during shipment.

## 2.05 DOOR FABRICATION

- .1 Doors: Swing type, flush, with provision for louvred openings as indicated on Drawings.
- .2 Fabricate doors with longitudinal edges locked seamed.
  - .1 Seams: Grind welded joints flat, fill with metallic paste filler and sand to uniform, smooth finish.
- .3 Cores:
  - .1 Interior doors:
    - .1 Typical: Honeycomb.
  - .2 Laminate core materials to face sheets under pressure.
- .4 Blank, reinforce, drill, and tap doors for mortised, templated hardware. Reinforce doors for surface-mounted hardware where required.
- .5 Factory prepare 13 mm diameter holes and larger diameter holes on-site at time of hardware installation, except for mounting and through-bolt holes.
- .6 Touch-up areas where zinc coating has been removed during fabrication with shop-applied primer.
- .7 Reinforced steel doors:
  - .1 Reinforce doors with vertical stiffeners, securely laminated to face sheets at a maximum 150 mm on-centre.
  - .2 Fill voids between stiffeners of interior doors with honeycomb core.

## 2.06 ACCESSORIES

- .1 Exposed fasteners: Type 304 stainless steel.
- .2 Door silencers/bumpers: In accordance with Section 08 71 00 - Door Hardware.
- .3 Touch-up primers: To CAN/CGSB-1.181, CAN/CGSB 1.132, MPI APL # 18, 19, 20.
  - .1 Coordinate with Section 09 91 23 - Interior Painting for compatibility between primers used on doors and frames and specified paint systems.
- .4 Metallic paste filler: Manufacturer's standard.
- .5 Door top caps:
  - .1 Interior: Steel channels.

- .6 Isolation coatings: Bituminous paint or epoxy resin solutions, alkali-resistant.
- .7 Sealants: in accordance with Section 07 92 00 - Joint Sealants.

### **3 EXECUTION**

#### **3.01 EXAMINATION**

- .1 Site measurements:
  - .1 Measure constructed opening dimensions on site. Indicate measured opening dimensions on shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.
  - .2 When site measurements cannot be made without delaying the work, establish dimensions and proceed with fabricating doors and frames without site measurements. Coordinate site construction to ensure opening dimensions correspond to established dimensions.

#### **3.02 INSTALLATION**

- .1 Install doors and frames to CSDMA's Guide Specification for Installation and Storage of Hollow Metal Doors and Frames, SDI-122.
- .2 Protect metal surfaces in contact with concrete, masonry, mortar, plaster, or other cementitious surface with isolation coating.
- .3 Install door hardware in accordance with Section 08 71 00 - Door Hardware, using manufacturer's door hardware templates.
- .4 Frames:
  - .1 Install suitable floor plates to anchor frames to floor assemblies.
  - .2 Set frames plumb, square, level, and at correct elevation.
  - .3 Secure anchors and connections to adjacent construction.
  - .4 Brace frames rigidly in position until built-in:
    - .1 Remove temporary jamb spreaders.
    - .2 Provide temporary wood spreaders at third points of frame rebate height to maintain frame width until adjacent built-in work is complete.
    - .3 Provide vertical support at centre of head for openings exceeding 1200 mm in width.
    - .4 Remove wood spreaders after frames are built-in.
  - .5 Allow for structural deflection to ensure structural loads are not transmitted to frames.
  - .6 Apply sealant at perimeter of frames between frame and adjacent material.
  - .7 Coordinate with Section 09 21 16 – Gypsum Board Assemblies for reveals around edges of door frames.
  - .8 Install door silencers.
- .5 Louvres: Install in accordance Manufacturer's written instructions.

- .6 Tolerances:
  - .1 Provide even margins between doors and jambs, and doors and finished floors and transitions.
    - .1 Hinge side: 1.0 mm.
    - .2 Latch side and head: 1.5 mm.
    - .3 Finished floors and transitions: Maximum 19 mm.

### 3.03 ADJUSTING

- .1 Touch-up finishes damaged during installation with primer.
- .2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler. Sand to uniform, smooth finish.
- .3 Repair damage to zinc coatings in accordance with ASTM A780/A780M.
- .4 Adjust operable parts for correct function.

### 3.04 CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning, and:
  - .1 Remove traces of primer, sealants, epoxy, and filler materials. Clean doors and frames.

### 3.05 PROTECTION

- .1 Protect partially installed and completed work from damage in accordance with Section 01 76 00 - Protecting Installed Construction, and:
  - .1 Install temporary protective covering to exposed components.

**END OF SECTION**



## **1 GENERAL**

### **1.01 SUMMARY**

- .1 Section includes:
  - .1 Flush wood doors.
  - .2 Factory finishing, Preparation for site finishing.

### **1.02 RELATED REQUIREMENTS**

- .1 Section 08 11 13 - Hollow Metal Doors and Frames
- .2 Section 08 71 00 - Door Hardware
- .3 Section 09 91 23 - Interior Painting

### **1.03 DEFINITIONS**

- .1 N/A

### **1.04 REFERENCE STANDARDS**

- .1 ASTM International (ASTM):
  - .1 ASTM D6007-22, Standard Test Method for Determining Formaldehyde Concentrations in Air from Wood Products Using a Small-Scale Chamber
  - .2 ASTM E1333-22, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates From Wood Products Using a Large Chamber
- .2 Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute (AWMAC/WI):
  - .1 North American Architectural Woodwork Standards (NAAWS), 4.0
- .3 CSA Group (CSA):
  - .1 CSA A440.4:19, Window, door, and skylight installation
  - .2 CAN/CSA O132.2 Series-90, Wood Flush Doors
- .4 Decorative Hardwoods Association (DHA):
  - .1 ANSI/HVPA HP 1 2020, American National Standard for Hardwood and Decorative Plywood
- .5 International Organization for Standardization (ISO):
  - .1 ISO 4586, High-pressure decorative laminates - Sheets made from thermosetting resins (usually called laminates), current editions
- .6 Window and Door Manufacturers Association (WDMA):
  - .1 ANSI/WDMA I.S. 1A-21, Interior Architectural Wood Flush Doors

#### 1.05 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
  - .1 Coordinate steel door frame dimensions and installation tolerances with Section 08 11 13 - Hollow Metal Doors and Frames.
  - .2 Coordinate door hardware with Section 08 71 00 - Door Hardware.

#### 1.06 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product data: Product literature and data sheets for each type of wood door, including product characteristics, performance criteria, physical sizes, finishes, and limitations.
  - .1 Submit WHMIS SDSs for:
    - .1 adhesives
    - .2 sealants
    - .3 coatings
- .3 Shop drawings:
  - .1 Comply with NAAWS requirements.
  - .2 For each type of door include scaled details of components and indicate:
    - .1 Size of door.
    - .2 Core construction and thickness.
    - .3 Cut-outs and locations for louvres, if applicable.
    - .4 Swing direction.
    - .5 Undercut dimensions.
    - .6 Hardware location and preparation requirements.
    - .7 Location of sealants.
    - .8 Types of finishes.
- .4 Samples:
  - .1 Submit two (2) plastic laminate samples, approximately 200 mm × 200 mm, for each colour/pattern required.
  - .2 Samples will not be returned.

#### 1.07 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and maintenance data:
  - .1 Include, in the operation and maintenance manual, manufacturer's operating and maintenance instructions and recommended cleaning materials and methods.
- .3 Warranty documentation: Submit manufacturer's material warranty.

## **1.08 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Manufacturers/installers: Capable of providing specified warranty requirements.

## **1.09 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements, and:
  - .1 Comply with NAAWS.
- .2 Delivery and acceptance requirements: Deliver materials to site in original factory packaging with manufacturer's labels.
- .3 Storage and handling requirements:
  - .1 Arrange for delivery after construction activities causing high humidity are completed.
  - .2 Unwrap and protect doors from scratches, handling marks, other damages, dampness and in accordance with manufacturer's recommendations and CAN/CSA O132.2 Series, Appendix A.
  - .3 Store doors away from direct sunlight.

## **1.10 SITE CONDITIONS**

- .1 Ambient conditions:
  - .1 Maintain optimum ambient conditions in accordance with NAAWS requirements.
- .2 Site measurements: Before fabrication, verify actual dimensions of openings by measuring on site, and indicate actual measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.
- .3 Established dimensions: When site measurements cannot be made without delaying the work, establish dimensions and proceed with fabricating doors without site measurements. Coordinate site construction to ensure that actual site dimensions correspond to established dimensions.

## **1.1 WARRANTY**

- .1 Submit warranty information in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Manufacturer warranty: Manufacturer's standard warranty document, executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights the Owner may have under the Contract.
  - .1 Manufacturer's warranty period: 10 years minimum.

## **2 PRODUCTS**

### **2.01 GENERAL PRODUCT REQUIREMENTS**

- .1 Performance/design criteria:
  - .1 Quality grades:
    - .1 Provide materials and fabricate architectural woodwork in accordance with NAAWS requirements for specified grades:
      - .1 Custom Grade: Typical throughout the project.
  - .2 Flush wood doors construction: To ANSI/WDMA I.S. 1A Duty Level, CAN/CSA O132.2.1: Heavy Duty.
- .2 Basis of Design Manufacturers:
  - .1 Lambton Doors
  - .2 Door-Lam Manufacturing
  - .3 Les Portes Baillergeon
  - .4 Accepted equivalents.

### **2.02 WOOD FLUSH DOORS**

- .1 Construction: 5 -ply for doors.
- .2 Door core:
  - .1 Solid particleboard core: Internal stile and rail frame bonded to particleboard core with wood lock blocks.
- .3 Door faces:
  - .1 Faces for opaque finish:
    - .1 Closed grain hardwood.
- .4 Door edges: NAAWS Type B (wood veneer edgeband, face and cross band edges covered) or Type F (solid wood edgeband, face and cross band edges covered) unless otherwise recommended by Manufacturer's choice in accordance with NAAWS grade requirements and accepted by Consultant.
- .5 Adhesive: ANSI/HPVA HP-1 Type II (water-resistant).

### **2.03 PLASTIC LAMINATE FACED WOOD DOORS**

- .1 Door construction: 5-Ply.
- .2 Core material: Particleboard.
- .3 Plastic laminate faces: To ISO 4586, high-pressure laminates, 1.27 mm thick.
  - .1 Colour: As selected by the Consultant from manufacturer's samples (premium grade).

- .4 Door edges: NAAWS Type C (HPL or PVC edgeband, face and cross band edges covered unless otherwise recommended by Manufacturer's choice in accordance with NAAWS grade requirements and accepted by Consultant.
  - .1 Edgeband to match plastic laminate face.
- .5 Plastic laminate adhesive: To ANSI/HPVA HP-1, Type II (water-resistant) for interior doors.

## **2.04 FABRICATION**

- .1 Provide blocking for surface-mounted hardware to prevent need for through bolting.
- .2 Vertical edge profiles:
  - .1 Bevel vertical edges of single acting doors 3 mm in 50 mm on the lock side and 1.5 mm in 50 mm on the hinge side.
  - .2 Pair of doors meeting edges: Non-bevelled or Bevelled, as recommended by Manufacturer and accepted by Consultant.
- .3 Finish plastic laminate smooth and flush with stile edges of door, bevel at approximately 20 degrees.
- .4 Factory-prepare holes 13 mm in diameter and field-prepare larger ones except mounting and through-bolt holes, on site when installing hardware.
- .5 Manufacturer's nameplates on doors are not permitted. Nameplates on hinge edge are acceptable.

## **2.05 FINISHES**

- .1 Primer materials: As required by manufacturer and/or AWMAC standards and recommendations.
- .2 Shop priming for doors with opaque finish:
  - .1 Before applying shop primer, steam out deep scratches and ease sharp edges by sanding.
  - .2 Shop prime doors with one coat of wood primer. Primer compatible with finish paint indicated in Section 09 91 23 - Interior Painting. Apply primer to all four door edges, to edges of cut-outs, and to mortises.

## **2.06 ACCESSORIES**

- .1 Door hardware: In accordance with Section 08 71 00 - Door Hardware.

## **3 EXECUTION**

### **3.01 EXAMINATION**

- .1 Verification of conditions:
  - .1 Verify substrate and project conditions in accordance with Section 01 71 00 - Examination and Preparation, and:
    - .1 Verify door frames are plumb, square, level, and in plane.

### 3.02 INSTALLATION

- .1 Install doors in accordance with manufacturer's instructions and NAAWS Section 14, in accordance with grade specified, CAN/CSA-O132.2 Series, Appendix A, CSA A440.4.
- .2 Install louvres and stops in accordance with manufacturer's instructions.
- .3 Install hardware in accordance with Section 08 71 00 - Door Hardware.
- .4 Tolerances: To NAAWS, Section 15. Provide even margins between door and jambs, and:
  - .1 Hinge side: 1.0 mm.
  - .2 Latch side and head: 1.5 mm.
  - .3 Finished floor and transitions: Maximum 19 mm.

### 3.03 SITE QUALITY CONTROL

- .1 N/A

### 3.04 ADJUSTING

- .1 Adjust doors and hardware to function correctly, operate smoothly and easily, without binding. Adjust pairs of doors when closed within 1.6 mm of flush at the meeting edge.
- .2 Fill and retouch minor nicks, chips, and scratches. Replace un-repairable damaged items.
- .3 Repair damage to adjacent materials caused by wood doors installation.

### 3.05 CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning, and:
  - .1 Clean doors after installation to remove dust, fingerprints, and pencil marks.
  - .2 Clean glass and glazing materials with non-abrasive cleaner.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 09 21 16 - Gypsum Board Assemblies
- .2 Section 09 30 13 - Ceramic Tiling

### **1.02 REFERENCE STANDARDS**

- .1 ASTM International (ASTM):
  - .1 ASTM A653/A653M-20, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  - .2 ASTM A780/A780M-20, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
  - .3 ASTM A1008/A1008M-13, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
  - .4 ASTM A666-15, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
  - .5 ASTM B221-20, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

### **1.03 SECTION INCLUDES**

- .1 Non-rated access doors in walls and partitions
- .2 Non-rated access doors in ceilings

### **1.04 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination:
  - .1 Coordinate framing dimensions and installation of access doors and panels in walls and partitions with Section 09 21 16 - Gypsum Board Assemblies.
  - .2 Coordinate installation of access doors and panels with Section 09 30 13 - Ceramic Tiling.
  - .3 Coordinate work of mechanical and electrical Subcontractors to avoid where possible locating access doors and panels in ceilings of the following areas: Gypsum board ceilings.
- .2 Pre-installation Meetings: Hold a meeting in accordance with Section 01 31 19 – Project Meetings:
  - .1 Attended by Contractor, Subcontractor responsible for this Section, mechanical Subcontractor, Owner's representative, Consultant, and other Subcontractors affected by work of this Section.
  - .2 Agenda: Discuss locations and types of access doors and panels, and obtain Owner's representative's and Consultant's acceptance of doors and panels in prominent locations (e.g., gypsum board ceilings).

#### **1.05 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's product data for each type of access door and panel components. Indicate door designation, type and model, product characteristics, fabrication details, dimensions, latching and locking types, and sound transmission class rating (if located in an STC rated assembly), and finishes.
  - .2 Submit WHMIS SDS.
- .3 Shop Drawings:
  - .1 Submit a shop drawing of reflected ceiling plan drawn to scale. Indicate all ceiling-mounted items, and items penetrating ceiling, including access doors and panels, diffusers, grilles, light fixtures, emergency lighting, speakers, and sprinkler heads.
  - .2 Submit access door and panel schedule. Include types, specific room numbers, dimensions, latching and locking types.
- .4 Manufacturers' Instructions: Submit manufacturer's installation instructions.

#### **1.06 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Supply two keys for each cylinder lock and ensure all access panels are keyed alike unless otherwise requested by Owner's representative.
- .3 Warranty Documentation: Submit manufacturer's warranty.

#### **1.07 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Manufacturer: Five (5) years manufacturing access doors similar to those required for this Project. Obtain each type of access door and panel from a single manufacturer.
  - .2 Installers: Two (2) years of experience installing access doors and panels of similar complexity and scope to that required for the Project.

#### **1.08 DELIVERY, STORAGE, AND HANDLING**

- .1 Perform in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging with manufacturer's labels.
  - .1 Provide temporary protection during delivery and site storage to prevent distortion, surface damage, and rust.
  - .2 After arrival on site, immediately remove wet wrapping materials, inspect doors and panels for damage, and notify delivery company and supplier if damage is found.
  - .3 Minor damage may be repaired if refinished products match new work, and are acceptable to Owner's representative and Consultant.



- .3 Storage and Handling Requirements:
  - .1 Store materials off ground, in a dry interior location away from direct sunlight, in a way that prevents sagging, bowing, or twisting, and in accordance with manufacturer's recommendations.
  - .2 Store and protect access doors and panels from nicks, scratches, distortion and rust.

## **1.09 SITE CONDITIONS**

- .1 Site Measurements: Before fabrication, verify actual dimensions of openings by measuring on site, and indicate actual measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

## **1.10 WARRANTY**

- .1 Manufacturer's Warranty: One (1) year warranty, free from defects in material and manufacturing.

## **2 PRODUCTS**

### **2.01 MATERIALS**

- .1 Steel Sheet: To ASTM A1008/A1008M
- .2 Galvannealed Steel: To ASTM A653/A653M
- .3 Stainless Steel: To ASTM A666, Type 304
- .4 Aluminum: To ASTM B221, extruded aluminum alloy, 6063-T6

### **2.02 ACCESS DOORS – NON-RATED WALLS AND PARTITIONS**

- .1 Basis of Design: Bauco, Bauco Plus II, for gypsum board wall finish and acoustic panel applications, or accepted equivalent.
  - .1 Mounting Type: Recess-mounted with only frame edge and door visible
  - .2 Clear Opening Size: as required, determine in the field.
  - .3 Door & Frame: Door recess for gypsum board installation to match thickness of adjacent wall. Concealed frame (rear-mounted) with finish edge.
  - .4 Door Corners: square, unless otherwise accepted by Owner's representative and Consultant.
  - .5 Hinges: Galvanized steel or stainless steel, concealed hinge, 180 degree swing. Removable hinge pine to allow removal of door panel from frame, with safety cable to secure door to frame.
  - .6 Lock / Latch Devices: Touch latch or slotted cam, as selected by Owner's representative and Consultant.
  - .7 STC-Rated Assemblies: Acoustic insulation applied to rear of access door for all access doors in STC rated wall assemblies. Continuous gasket at frame perimeter to maintain STC value of wall/partition assembly.
- .2 Basis of Design: for tile wall finish applications.

- .1 Mounting Type: Surface-mounted with frame and door visible.
- .2 Clear Opening Size: as required, determine in the field.
- .3 Door & Frame: steel, galvanized steel or aluminum, prepped for field painting, to match adjacent finish colour.
- .4 Door Corners: rounded safety corners, unless otherwise accepted by Owner's representative and Consultant.
- .5 Hinges: Galvanized steel or stainless steel, concealed hinge, 180 degree swing. Removable hinge pin to allow removal of door panel from frame, with safety cable to secure door to frame.
- .6 Lock / Latch Devices: Flush, common slot screwdriver cam latch.
- .7 STC-Rated Assemblies: Acoustic insulation applied to rear of access door for all access doors in STC rated wall assemblies. Continuous gasket at frame perimeter to maintain STC value of wall/partition assembly.

### **2.03 ACCESS DOORS – NON-RATED IN CEILINGS**

- .1 Basis of Design: Bauco, Bauco Plus II, for gypsum board ceiling finish applications, or accepted equivalent.
  - .1 Mounting Type: Recessed mounted with only frame edge and door visible
  - .2 Clear Opening Size: as required, determine in the field.
  - .3 Door & Frame: Door recess for gypsum board installation to match thickness of adjacent wall. Concealed frame (rear-mounted) with finish edge.
  - .4 Door Corners: square, unless otherwise accepted by Owner's representative and Consultant.
  - .5 Hinges: Galvanized steel or stainless steel, concealed hinge, 180 degree swing. Removable hinge pin to allow removal of door panel from frame, with safety cable to secure door to frame.
  - .6 Lock / Latch Devices: Touch latch or slotted cam, as selected by Owner's representative and Consultant.

### **2.04 FABRICATION**

- .1 Access Door Sizes: Provide with the following clear opening dimensions, except where indicated otherwise:
  - .1 For body entry: minimum 600 mm x 600 mm nominal
  - .2 For hand entry: minimum 300 mm x 300 mm nominal
- .2 Fabricate access doors and panel assembly as a single unit, ready for site installation.
- .3 Fabricate large units with sufficient quantity of latches to hold door flush with frame.
- .4 Fabricate units rigid with bracing and reinforcements as required to remain square and prevent sagging.
- .5 Fabricate visible surfaces flat and smooth without embossed or imprinted manufacturer's name. Grind visible welds smooth and blended.

- .6 Touch-up factory-applied coatings and galvanized surfaces where finish was removed during fabrication.
- .7 Locate label indicating manufacturer and model on rear of panel door or other concealed surface.

### **3 EXECUTION**

#### **3.01 EXAMINATION**

- .1 Verification of Conditions: Verify conditions of substrates previously installed are acceptable for access doors and panels installation, in accordance with manufacturer's instructions.
  - .1 Proceed with installation only after unacceptable conditions have been remedied.

#### **3.02 INSTALLATION**

- .1 Installation: locate access doors within view of equipment and ensure equipment is accessible for operating, inspecting, adjusting, servicing without using special tools.
  - .1 Install access doors and panels permitting access to service valves, traps, dampers, cleanouts, and other mechanical, electrical and conveyor control items concealed by walls and partitions, and concealed above gypsum board and acoustic panel ceilings.
- .2 Isolate steel and aluminum from direct contact with dissimilar metals, concrete, and masonry with isolation coating of alkali-resistant bituminous paint, epoxy, or other permanent non-corrosive material recommended by manufacturer.
- .3 Set frames square and in-plane with the substrate assembly, aligned with adjacent visible finishes. Securely attach to substrates.
- .4 Access Doors above Acoustic Panel Ceilings: Install unobtrusive identification locators, such as a small self-adhering circle on the acoustic panel.

#### **3.03 ADJUSTING**

- .1 Touch-up with factory-applied finishes if damaged during installation.
- .2 Repair damage to zinc coatings in accordance with ASTM A780/A780M.
- .3 Repair damage to adjacent materials caused by installation of access doors and panels.
- .4 Adjust operable parts for correct function.

#### **3.04 CLEANING**

- .1 Progress and Final Cleaning: Perform in accordance with Section 01 74 00 - Cleaning and remove gypsum board compound from hinges, frames, and door edges.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 08 11 13 - Hollow Metal Doors and Frames
- .2 Section 08 14 00 - Wood Doors
- .3 Section 10 22 19 – Demountable Partitions

### **1.02 REFERENCE STANDARDS**

- .1 American National Standards Institute (ANSI)/Builders Hardware Manufacturers Association (BHMA):
  - .1 ANSI/BHMA A156.1-2016, Butts and Hinges
  - .2 ANSI/BHMA A156.2-2017, Bored and Preassembled Locks and Latches
  - .3 ANSI/BHMA A156.4-2019, Door Controls - Closers
  - .4 ANSI/BHMA A156.5-2020, Cylinders and Input Devices for Locks
  - .5 ANSI/BHMA A156.6-2015, Architectural Door Trim
  - .6 ANSI/BHMA A156.8-2015, Door Controls - Overhead Stops and Holders
  - .7 ANSI/BHMA A156.13-2017, Mortise Locks and Latches
  - .8 ANSI/BHMA A156.16-2018, Auxiliary Hardware
  - .9 ANSI/BHMA A156.18-2020, Materials and Finishes
  - .10 ANSI/BHMA A156.28-2018, Recommended Practices for Mechanical Keying Systems
  - .11 ANSI/BHMA A156.36-2020, Auxiliary Locks
- .2 Canadian Steel Door Manufacturers' Association (CSDMA):
  - .1 Recommended Dimensional Standards for Commercial Steel Doors and Frames, 2000
- .3 CSA Group (CSA):
  - .1 CSA B651-18, Accessible Design for the Built Environment
- .4 Door and Hardware Institute (DHI):
  - .1 Sequence and Format for the Hardware Schedule, 2019

### **1.03 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination: Obtain and distribute templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Coordinate with shop drawings or other Sections. Confirm that adequate provisions are made for locating and installing door hardware in accordance with indicated requirements, and as follows:
  - .1 Coordinate door hardware with Section 08 11 13 - Hollow Metal Doors and Frames and 08 14 00 - Wood Doors.

#### **1.04 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's product data for each type of door hardware. Include product characteristics, performance criteria, profiles, dimensions, finishes, and limitations.
- .3 Contract Door Hardware Schedule: Submit schedule prepared by or under the supervision of a qualified hardware consultant detailing fabrication and assembly of door hardware.
  - .1 Comply with DHI Sequence and Format for the Hardware Schedule.
  - .2 Organize the door hardware schedule into door hardware groups indicating a complete description of every item required for each door (or opening).
  - .3 Indicate hardware make, model, material, function, handing, size, fastening, and finish using codes in BHMA A156.18, and other pertinent information.
  - .4 Include keying schedule describing how each locking device is keyed in accordance with ANSI/BHMA A156.28. Index each key type to a specific door number.
  - .5 Indicate location of each door hardware set, cross-referencing door numbers indicated in the Contract Documents.
  - .6 Include an explanation of abbreviations, symbols, and alphanumeric codes in contract hardware schedule, where applicable.
- .4 Test Reports: When requested, submit certified test reports showing a product's compliance to a specified referenced standard.
- .5 Manufacturer's Instructions: Submit manufacturer's installation instructions.

#### **1.05 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: Submit operation and maintenance data for door hardware and incorporate into manual.
- .3 Warranty Documentation: Submit manufacturer's material and fabrication warranty.

#### **1.06 MAINTENANCE MATERIAL SUBMITTALS**

- .1 Extra Stock Materials: Supply maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
  - .1 Tools: Supply two sets of wrenches for door closers and locksets hardware.

#### **1.07 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Installer: Completed door hardware projects similar in scope to this Project with a record of successful in-service performance in the past five (5) years.

## **1.08 DELIVERY, STORAGE, AND HANDLING**

- .1 Perform in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging and with manufacturer's labels.
- .3 Package hardware items, including fasteners, separately or in groups of related hardware. Protect prefinished surfaces with wrapping, strippable coating, or other protective packaging. Label each package with their contents and location in building.
- .4 Storage and Handling Requirements:
  - .1 Store materials off ground in a dry, well-ventilated indoor location, and in accordance with manufacturer's recommendations.
  - .2 Store and protect door hardware from scratches and other damages.

## **1.09 WARRANTY**

- .1 Provide five (5) year manufacturer warranty for door closers.
  - .1 Warranty period commences from date of Substantial Performance of the Work.

## **2 PRODUCTS**

### **2.01 SUPPLIERS**

- .1 Acceptable Suppliers include:
  - .1 Knells
  - .2 Muller Hardware & Supply
  - .3 Tykel Commercial Door and Supply Inc.
- .2 Other accepted equivalents.

### **2.02 DOOR HARDWARE**

- .1 Use products from only one manufacturer for similar items.
- .2 Hinges:
  - .1 Basis of Design:
    - .1 Manufacturer: Stanley or accepted equivalent
    - .2 Heavy duty type
  - .2 Butts and Hinges: To ANSI/BHMA A156.1
- .3 Locks and Latches:
  - .1 Bored and preassembled locks and latches: To ANSI/BHMA A156.2, series 2000 preassembled lock, grade 1 or series 4000 bored lock, grade 1, designed for function as stated in Hardware Schedule and keyed based on Owner's existing system.
  - .2 Interconnected locks and latches: To ANSI/BHMA A156.12, series 5000 interconnected lock, grade 1, designed for function as stated in Hardware Schedule and keyed based on Owner's existing system.

- .3 Mortise Locks and Latches: To ANSI/BHMA A156.13, ANSI/BHMA A156.34, series 1000 mortise lock, grade 1, designed for function as stated in Hardware Schedule and keyed based on Owner's existing system.
- .4 Lever Handles: Style as selected by Consultant from Manufacturer's standard options to match those on the third floor of the building, basis of design: Schlage Tubular (TLR) or accepted equivalent.
- .5 Cylinder Collar (rose, escutcheon): Round where required.
- .6 Normal strikes: Box type, lip projection not beyond jamb.
- .7 Cylinders: To ANSI/BHMA A156.5, key into keying system as directed by Owner, basis of design: Schlage or accepted equivalent
- .8 Finishes: To ANSI/BHMA A156.18, to be confirmed by Consultant during submittal review process.
- .4 Door Closers and Accessories:
  - .1 Door controls (closers): To ANSI/BHMA A156.4, in accordance with ANSI/BHMA A156.4, table A1.
  - .2 Finishes: to be confirmed by Consultant during submittal review process.
- .5 Architectural Door Trim: To ANSI/BHMA A156.6, designated by letter J and numeral identifiers as listed below.
  - .1 Door Protection Plates: Kick plate, 200 mm height, 1.27 mm thick stainless steel.
  - .2 Push Plates: 1.27 mm thick stainless steel.
  - .3 Push/Pull Units: combination, 1.27 mm thick stainless steel.
- .6 Auxiliary hardware: To ANSI/BHMA A156.16.
  - .1 Wall, floor, or concealed overhead stop: as indicated in Door Schedule.
  - .2 Door silencer: Single stud neoprene type, black or grey colour. Self-adhesive type silencers are not acceptable.

## 2.03 FASTENINGS

- .1 Use only fasteners provided by the manufacturer. Failure to comply may void warranties and applicable licensed labels.
- .2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
- .3 Match exposed fastening devices to finish of hardware.
- .4 Where pull is positioned on one side of the door and push plate on the other side, supply fastening devices, and install to secure pull through the door from the reverse side. Install push plate to cover fasteners.
- .5 Use fasteners compatible with the material they are used in.

## 2.04 KEYING

- .1 Doors to be keyed as directed. Prepare detailed keying schedule in conjunction with Owner's representative.

- .2 Hardware for building renovation to match existing type, material and finish, and to be keyed into existing system.
- .3 Provide keys in duplicates for every lock of the Work.
- .4 Provide 3 master keys for each master key or grand master key group, unless otherwise requested by Owner.
- .5 Stamp keying code numbers on keys and cylinders.
- .6 Provide construction cores.
- .7 Provide permanent cores and deliver keys to Owner's representative.

### **3 EXECUTION**

#### **3.01 INSTALLATION**

- .1 Manufacturer's Instructions: Comply with manufacturer's recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Provide metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.
- .3 Provide manufacturers' instructions for proper installation of each hardware component.
- .4 Install hardware to standard hardware location dimensions in accordance with CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames and CSA B651.
- .5 Where door stop comes into contact with door pull, mount stop to strike bottom of pull.
- .6 Use only manufacturer's supplied fasteners.
  - .1 Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.
- .7 Remove construction cores when directed by Owner.
  - .1 Install permanent cores and confirm locks operate correctly.

#### **3.02 ADJUSTING**

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

#### **3.03 CLEANING**

- .1 Progress Cleaning: Perform in accordance with Section 01 74 00 - Cleaning and as follows:
  - .1 Remove protective coatings and wrappings from hardware items.
  - .2 Final Cleaning: Perform in accordance with Section 01 74 00 - Cleaning.



### **3.04 DEMONSTRATION**

- .1 Keying System Setup and Cabinet:
  - .1 Set up key control system with file key tags, duplicate key tags, numerical index, alphabetical index, key change index, label shields, control book and key receipt cards.
  - .2 Place file keys and duplicate keys in key cabinet on their respective hooks.
  - .3 Lock key cabinet and provide key to Owner's representative.
- .2 Maintenance Staff Briefing: Brief maintenance staff regarding the following:
  - .1 Proper care, cleaning, disinfecting, and general maintenance of hardware.
  - .2 Description, use, handling, and storage of keys.
  - .3 Use, application and storage of wrenches for door closers and locksets.
- .3 Demonstrate operation, operating components, adjustment features, and lubrication requirements.

### **3.05 PROTECTION**

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

### **3.06 DOOR HARDWARE SCHEDULE**

- .1 Refer to Door Schedule in Drawings.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 10 22 19 Demountable Partitions

### **1.02 REFERENCE STANDARDS**

- .1 American National Standards Institute (ANSI):
  - .1 ANSI Z97.1-2015, Safety Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test
- .2 ASTM International (ASTM):
  - .1 ASTM C1503-18, Standard Specification for Silvered Flat Glass Mirror
  - .2 ASTM E84-20, Standard Test Method for Surface Burning Characteristics of Building Materials
- .3 Canadian General Standards Board (CGSB):
  - .1 CAN/CGSB-12.1-2017, Safety Glazing
  - .2 CAN/CGSB-12.2-M 91, Flat, Clear Sheet Glass
  - .3 CAN/CGSB-12.3-M 91, Flat, Clear Float Glass
- .4 National Glass Association with GANA (NGA):
  - .1 GANA Glazing Manual-2008
  - .2 Laminated Glazing Reference Manual-2019
- .5 UL Canada (UL):
  - .1 UL 2761-2011, Sealants and Caulking Compounds
- .6 ULC Standards (ULC):
  - .1 CAN/ULC S102-10, Test for Surface Burning Characteristics of Building Materials and Assemblies

### **1.03 ADMINISTRATIVE REQUIREMENTS**

- .1 Sequencing:
  - .1 Comply with manufacturer's recommendations for sequencing construction operations.
  - .2 Coordinate mirror with extents of adjacent ceramic tile finish prior to finish installation.

### **1.04 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, product literature and data sheets for glass, sealants, and glazing accessories and include product characteristics, performance criteria, physical size, finish, and limitations.

- .2 Submit WHMIS SDS.
- .3 Samples:
  - .1 Submit for review and acceptance of each type of unit.
  - .2 Samples will not be returned for inclusion into Work.
  - .3 Submit 150 mm x 150 mm size samples of mirror glass.
  - .4 Submit 150 mm x 150 mm sample for demountable wall glass.
  - .5 Submit manufacturer samples of surface-applied glazing films.
    - .1 Physical samples of manufacturer's standard offerings for initial selection.
    - .2 150 mm x 150 mm size sample for verification from initial selections.
- .4 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .5 Training/Certification of glazing installer within demountable wall systems:
  - .1 Submit documentation demonstrating training and/or certification completed with approval of demountable wall systems Manufacturer to install their system.

#### **1.05 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: Submit maintenance data for glazing and incorporate into manual.

#### **1.06 QUALITY ASSURANCE**

- .1 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .2 Glazing for demountable walls to be coordinated with demountable wall subcontractor and confirmed acceptable to reach specified STC rating requirements apart of demountable wall requirements.
- .3 Manufacturer Requirements:
  - .1 Manufacturers or fabricators shall have sufficient plant, equipment and competent personnel to provide the Products in accordance with the Contract Documents.
  - .2 Manufacturers or fabricators shall have minimum ten (10) years experience in the industry and shall have successfully completed Projects of similar scope and type.
- .4 Installer / Applicator Requirements:
  - .1 Installers or applicators of the Products specified herein shall be competent in the skills required to perform the tasks of this specification section and perform in accordance with industry standards, warranty requirements and generally accepted industry best practices.
  - .2 Installers or applicators shall have minimum three (3) years experience in the industry and shall have successfully completed Projects of similar scope and type.

- .3 Installers or applicators of glazing for demountable wall systems shall be trained and/or certified by demountable wall system Manufacturer. Documentation of training and/or certification to be provided to Consultant.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Storage and Handling Requirements:
  - .1 Store materials off ground, indoors in a clean dry location and in accordance with manufacturer's recommendations.
  - .2 Store and protect glazing from nicks, scratches, and edge damage.
  - .3 Protect prefinished aluminum surfaces with wrapping or strippable coating.
  - .4 Replace defective or damaged materials with new.

#### **1.08 AMBIENT CONDITIONS**

- .1 Ambient Requirements:
  - .1 Install glazing when ambient temperature is 10 °C minimum. Maintain ventilated environment for 24 hours after application.
  - .2 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.
  - .3 Refer to manufacturer's instructions for minimum ambient temperature for application of glazing film.

#### **1.09 WARRANTY**

- .1 Provide a warranty certificate stating that the mirrored glass units specified under this section are guaranteed against degradation or failure of the mirror coating for a period of five (5) years from the date of Substantial Performance.

### **2 PRODUCTS**

#### **2.01 MATERIALS**

- .1 Design Criteria:
  - .1 Size glass to withstand wind loads, dead loads and positive and negative live loads acting on normal to plane of glass to a design pressure measured in accordance with the Ontario Building Code and CAN/CGSB-12.20.
  - .2 Limit glass deflection to flexural limit of glass with full recovery of glazing materials.
  - .3 Provide thermal stress analysis for all single glazed lites and all sealed glass units.
    - .1 Make recommendations for additional heat treatment, thickness change, or other required modifications prior to ordering of materials or manufacture of sealed glass units.

- .2 Flat Glass:
  - .1 Safety glass: to CAN/CGSB-12.1
    - .1 Type 1-Laminated
      - .1 Colour / Finish: transparent
      - .2 Thicknesses as indicated on the Drawings, Schedules, and other specification sections.
      - .3 Tong and roller mark free
      - .4 Visible after installation factory-applied permanent impression in one corner identifying each pane as tempered.
      - .5 STC value: coordinated with demountable partition STC system rating. Refer to Drawings and Section 10 22 19 – Demountable Partitions.
    - .2 Type 2-Tempered
      - .1 Colour / Finish: transparent
      - .2 Thicknesses as indicated on the Drawings, Schedules, and other specification sections.
      - .3 STC value: coordinated with demountable partition STC system rating. Refer to Drawings and Section 10 22 19 – Demountable Partitions.
  - .2 Silvered mirror glass: to ASTM C1503, 6 mm thick.
    - .1 Type 2-tempered - sheet glass
    - .2 Back finished with one coat silver, one coat copper, and two coats backing paint.
    - .3 Provide continuous satin finish stainless steel “J” channel frame on all perimeter edges of mirror installation. Butt joints between mirror sheets, with edges ground and polished.
      - .1 Exposed face of “J” trim to be 3 mm or smaller unless otherwise accepted by Consultant in writing.
    - .4 Mirrors to be adhesive mounted to wall.
    - .5 Refer to Drawings for mirror sizes.
- .3 Insulating Glass Units:
  - .1 Insulating glass units: as required by demountable partition manufacturer.
    - .1 Individual glass panes to be tempered or laminated.
    - .2 Sound Transmission Rating (STC): coordinated with demountable partition STC system rating. Refer to Drawings and Section 10 22 19 – Demountable Partitions.

## 2.02 GLAZING SURFACE FILMS

- .1 Privacy Film: Polyester film, with pressure-sensitive adhesive and release liner.
  - .1 Colour / Finish: Custom gradient pattern from clear to frost to clear, as indicated in the Drawings.

- .1 Basis of Design: Full frost section to achieve 3M Glass Finish Milky White SH2MAML level of and texture of frost, or approved equivalent.
- .2 Thickness: minimum 0.050 mm (2 mils).
- .3 Size: full width of all glazing in project, refer to Drawings for height and proportion of gradient to full frost.

## **2.03 ACCESSORIES**

- .1 As required for complete installation into demountable partition system. Coordinate with Manufacturer requirements.
- .2 Mirror attachment accessories:
  - .1 Stainless or plated steel, J-shaped profile, sized to match thickness of mirror.
  - .2 Plastic rosettes.
  - .3 Mirror adhesive, chemically compatible with mirror coating and wall substrate.

## **3 EXECUTION**

### **3.01 EXAMINATION**

- .1 Verification of Conditions: Verify conditions of substrates previously installed are acceptable for beginning glazing installation in accordance with manufacturer's instructions.
  - .1 Verify that openings for glazing are correctly sized and within tolerance.
  - .2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.
  - .3 Visually inspect substrates.
  - .4 Inform Consultant of unacceptable conditions immediately upon discovery.
  - .5 Proceed with installation only after unacceptable conditions have been remedied.

### **3.02 PREPARATION**

- .1 Clean contact surfaces with solvent and wipe dry.
- .2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .3 Prime surfaces scheduled to receive sealant.
- .4 Preparation - Glazing films:
  - .1 Clean glazing before beginning installation using neutral cleaning solution.
  - .2 Ensure no deleterious material adheres to glazing.
  - .3 Ensure dust, grease, and chemical residue are removed from surface of glazing before installation of film.
  - .4 Examine glazing under natural daylight and identify cracks, blisters, bubbles, discolouration, edge defects or other anomalies that may cause film to delaminate or cause vision transparency or distortion problems.

### 3.03 INSTALLATION: GLAZING

- .1 Perform work in accordance with GANA Glazing Manual, and GANA Laminated Glazing Reference Manual for glazing installation methods.
- .2 Follow demountable wall manufacturer's recommendations and requirements for installation style, approach and details to achieve system's STC.

### 3.04 INSTALLATION: MIRRORS

- .1 Set mirrors with adhesive, applied in accordance with adhesive manufacturer's instructions with "J" trim frame.
- .2 Place plumb and level.
- .3 Coordinate with extents of adjacent ceramic tile finish.

### 3.05 INSTALLATION: PLASTIC FILM

- .1 Install plastic film in accordance with film manufacturer's instructions.
- .2 Place without air bubbles, creases, or visible distortion.
- .3 Site Installation of Glazing Film:
  - .1 Remove window stops and window sealing device.
  - .2 Ensure dust, grease, and chemical residue are removed from surface of glazing before installation of film.
  - .3 Examine glazing under natural daylight and identify cracks, blisters, bubbles, discolouration, edge defects or other anomalies that may cause film to delaminate, or cause vision transparency or distortion problems. Report findings to Consultant before starting work.
  - .4 Proceed with work only after receipt of written approval from Consultant.
  - .5 Install glazing film to glazing windows ensuring no blisters, bubbles, scratches, or distortions.
- .4 Cut film edges straight and square.
- .5 Fit tight to glass perimeter with cut edge. Cut edges in accordance with manufacturer's written instructions.
- .6 Splicing:
  - .1 Splice film only when glazing is greater in width than film.
  - .2 Splice film only after receipt of written approval from Consultant.
    - .1 Notify Consultant in writing if splicing is required for selected finish.
- .7 Use only water and film slip solution on glazing to facilitate positioning of film.
- .8 Ensure removal of excess water from between film and glazing.
- .9 Wash interior and exterior of each window and film, using cleaning solution recommended by film manufacturer.
- .10 Remove and replace film that continues to show blisters, bubbles, tears, scratches, edge defects or vision distortion in film when viewed under natural daylight from 2.0 metres minimum after 30-day period.

**3.06 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
  - .1 Remove traces of primer and sealants.
  - .2 Remove glazing materials from finish surfaces.
  - .3 Remove labels.
  - .4 Clean glass and mirrors using approved non-abrasive cleaner in accordance with manufacturer's instructions.

**3.07 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 After installation, mark each lite with an "X" by using removable plastic tape or paste.
- .3 Repair damage to adjacent materials caused by glazing installation.

**3.08 SCHEDULE**

- .1 Refer to Drawings and Section 10 22 19 – Demountable Partitions.

**END OF SECTION**



## **1 GENERAL**

### **1.01 SUMMARY**

- .1 Section includes:
  - .1 Gypsum board for interior partition and ceiling assemblies.
  - .2 Gypsum board reveal accessories.

### **1.02 RELATED REQUIREMENTS**

- .1 Section 05 41 00 - Structural Metal Stud Framing
- .2 Section 06 10 53 - Miscellaneous Rough Carpentry
- .3 Section 07 21 16 - Blanket Insulation
- .4 Section 07 92 00 - Joint Sealants
- .5 Section 08 31 00 - Access Doors and Panels
- .6 Section 09 22 16 - Non-Structural Metal Framing
- .7 Section 09 91 23 - Interior Painting

### **1.03 ABBREVIATIONS AND ACRONYMS**

- .1 N/A

### **1.04 DEFINITIONS**

- .1 N/A

### **1.05 REFERENCE STANDARDS**

- .1 Aluminum Association (AA):
  - .1 AA DAF 45-03, Designation System for Aluminum Finishes
- .2 ASTM International (ASTM):
  - .1 ASTM C473-19, Standard Test Methods for Physical Testing of Gypsum Panel Products
  - .2 ASTM C475/C475M-17, Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board
  - .3 ASTM C514-04, Standard Specification for Nails for the Application of Gypsum Board
  - .4 ASTM C840-18b, Standard Specification for Application and Finishing of Gypsum Board
  - .5 ASTM C954-18, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness
  - .6 ASTM C1002-07, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs

- .7 ASTM C1047-19, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
- .8 ASTM C1178/C1178M-18, Standard Specification for Glass Mat Water-Resistant Gypsum Backing Board
- .9 ASTM C1280-13, Standard Specification for Application of Gypsum Sheathing
- .10 ASTM C1396/C1396M-17, Standard Specification for Gypsum Board
- .11 ASTM C1629/C1629M-23, Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels
- .12 ASTM D3273-21, Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
- .13 ASTM E90-09, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
- .14 ASTM E413-16, Classification for Rating Sound Insulation
- .15 ASTM F1233-21, Standard Test Method for Security Glazing Materials And Systems
- .3 Gypsum Association (GA):
  - .1 GA-214-2021, Levels of Finish for Gypsum Panel Products
  - .2 GA-801-2023, Handling and Storage of Gypsum Panel Products: A Guide for Distributors, Retailers, and Contractors
- .4 International Organization for Standardization (ISO):
- .5 ULC Standards (ULC):
  - .1 CAN/ULC-S101-14, Standard Method of Fire Endurance Tests of Building Construction and Materials
  - .2 CAN/ULC-S102-10, Standard Method of Test of Surface Burning Characteristics of Building Materials and Assemblies

#### **1.06 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination:
  - .1 Coordinate with Section 07 21 16 - Blanket Insulation for acoustic batt insulation in interior partitions.
  - .2 Coordinate with Section 08 31 00 - Access Doors and Panels and mechanical and electrical notes for installation in gypsum board assemblies.
  - .3 Coordinate with Section 09 91 23 - Interior Painting for paint gloss levels that require a specific gypsum board finish level.

#### **1.07 ACTION AND INFORMATIONAL SUBMITTALS**

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

- .2 Product Data: Product literature and data sheets, including product characteristics, performance criteria, physical sizes, and limitations.
  - .1 Submit product data for:
    - .1 gypsum board and panel materials
    - .2 joint tapes
    - .3 joint compounds
    - .4 casing beads
    - .5 corner beads
    - .6 control joints
    - .7 edge trims
  - .2 Submit ULC fire-resistance assembly listings for each fire-rated assembly indicated in the Contract Documents or as required to maintain existing fire separations.
  - .3 Submit product data for assemblies indicating STC value based on testing of materials proposed for use on the Project.
- .3 Manufacturer's instructions:
  - .1 Special delivery, storage, and handling requirements.
  - .2 Installation instructions.
  - .3 Recommended sequencing.
  - .4 Cleaning procedures.

#### **1.08 QUALITY ASSURANCE**

- .1 N/A

#### **1.09 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements, and:
  - .1 Comply with GA-801 when handling or storing gypsum panel products.
  - .2 Carefully unload gypsum board shipment to prevent damage to edges and corners.
  - .3 Store and protect gypsum board materials from scratches, condensation, excessive humidity, and water damage.
  - .4 Handle gypsum boards to prevent damage to edges, ends, and surfaces.
  - .5 Protect ready-mix joint compounds from freezing, exposure to extreme heat, and direct sunlight.

#### **1.10 SITE CONDITIONS**

- .1 Ambient Conditions: Maintain environmental conditions in accordance with ASTM C840 and:
  - .1 Ventilate application areas, immediately after apply joint treatments, to remove excess moisture that might prevent proper drying of joints.

## 2 PRODUCTS

### 2.01 GENERAL REQUIREMENTS

- .1 Fire-resistance-rated assemblies: Provide materials identical to those in indicated assemblies tested in accordance with CAN/ULC-S101 by an independent testing agency.
- .2 Acoustic assemblies: Provide materials identical to those in indicated assemblies tested in accordance with ASTM E90 and classified in accordance with ASTM E413 by an independent testing agency.

### 2.02 GYPSUM BOARD AND PANEL MATERIALS

- .1 Gypsum Wallboard: To ASTM C1396/C1396M.
  - .1 Board size: 1220 mm wide x maximum practical lengths to suit application lengths.
  - .2 Board thickness: 15.9 mm for straight walls, two (2) layers of 6.4 mm for curved walls.
  - .3 Long edges: Tapered.
- .2 Acoustic gypsum board: To ASTM C1396/C1396M and ASTM C1766, regular and Type X with sound reducing core.
  - .1 Board size: 1220 mm wide x maximum practical lengths to suit application lengths.
  - .2 Board thickness: 15.9 mm for straight walls, two (2) layers of 6.4 mm for curved walls.
  - .3 Long edges: Tapered.
- .3 Gypsum ceiling board: To ASTM C1396/C1396M, regular and Type X.
  - .1 Board size: 1220 mm wide x maximum practical lengths to suit application lengths.
  - .2 Board thickness: 12.7 mm.
  - .3 Long edges: Tapered.
  - .4 Surface burning characteristics: To CAN/ULC-S102.
    - .1 Flame-spread rating: 0 maximum.
    - .2 Smoke developed classification: 0 maximum.
- .4 Water-resistant fibre-reinforced gypsum backing board.: To ASTM C1178/C1178M, regular and Type X, mould resistant.
  - .1 Board size: 1220 mm wide x maximum practical lengths to suit application lengths.
  - .2 Board thickness: 15.9 mm.
  - .3 Edges and ends: Tapered.
  - .4 Surface burning characteristics: To CAN/ULC-S102.
    - .1 Flame-spread rating: 0 maximum.
    - .2 Smoke developed classification: 0 maximum.

## 2.03 ACCESSORIES

- .1 Reveal Trim:
  - .1 Basis of Design: Fry Reglet Z-Reveal Molding, 16 mm x 12 mm, DRMZ-625-50, or accepted equivalent.
  - .2 Material: Extruded aluminum.
  - .3 Finish: Manufacturer's standard powder coat or anodized colour, as selected by Consultant.
    - .1 Clear anodized, white and ability to field paint to match wall are minimum options for Consultant to select from.
- .2 Miscellaneous framing: In accordance with Section 09 22 16 - Non-Structural Metal Framing.
  - .1 Furring channels
  - .2 Furring brackets
  - .3 Tie wires
  - .4 Inserts
  - .5 Flat straps and backing plates
  - .6 Anchors
- .3 Steel screws:
  - .1 Fastening gypsum board and gypsum sheathing to steel members less than 0.84 mm: To ASTM C1002, type S fine thread screws.
  - .2 Fastening gypsum board and gypsum sheathing to steel members from 0.84 mm to 2.84 mm thick: To ASTM C954.
  - .3 Fastening gypsum board to gypsum board (two-layer applications): To ASTM C1002, type G course-pitch high-thread self-piercing screws.
- .4 Stud adhesive: To ASTM C557.
- .5 Aminating compound: As recommended by manufacturer, asbestos-free.
- .6 Joint tape: To ASTM C475/C475M, as recommended by manufacturer for application type. Use mould-resistant tape for moisture-resistant boards.
- .7 Joint compound: To ASTM C475/C475M, as recommended by the manufacturer for application type.
- .8 Casing beads, corner beads, control joints, and edge trim: To ASTM C1047.
- .9 Sealants: In accordance with Section 07 92 00 - Joint Sealants.
- .10 Acoustic sealant: In accordance with Section 07 92 00 - Joint Sealants.
- .11 Refer to Section 07 84 00 - Firestopping for additional requirements.
- .12 Insulating gaskets: Moisture-resistant, nominal 3 mm thick, closed cell neoprene or polyethylene strip, width to match framing, with self-sticking permanent adhesive on one face, lengths as required.

### **3 EXECUTION**

#### **3.01 EXAMINATION**

- .1 Verification of conditions:
  - .1 Verify substrate and project conditions in accordance with Section 01 71 00 - Examination and Preparation, and:
    - .1 Verify substrates are dry, clean, and frost free.
    - .2 Verify metal framing is installed in accordance with Section 05 41 00 - Structural Metal Stud Framing and Section 09 22 16 - Non-Structural Metal Framing.
    - .3 Verify substrates are installed in accordance with ASTM C840.
    - .4 Verify substrate tolerances are suitable to achieve specified finished assembly tolerances.
    - .5 Verify bucks, anchors, blocking, and sound attenuation materials are installed.
    - .6 Verify work to be concealed has been reviewed and inspected by authority having jurisdiction (AHJ) (if required) and corrective work is completed, if any.

#### **3.02 GENERAL INSTALLATION REQUIREMENTS**

- .1 Fire-resistance-rated assemblies: Provide construction identical to that in indicated assemblies tested in accordance with CAN/ULC-S101 by an independent testing agency.
- .2 Acoustic assemblies: Provide construction identical to that in indicated assemblies tested in accordance with ASTM E90 and classified in accordance with ASTM E413 by an independent testing agency for assembly STC ratings indicated on Drawings.

#### **3.03 GYPSUM BOARD ASSEMBLY INSTALLATION**

- .1 Erect metal framing in accordance with Section 05 41 00 – Structural Metal Stud Framing and Section 09 22 16 - Non-Structural Metal Framing.
- .2 Install blocking, backing, and reinforcements in accordance with Section 06 10 53 - Miscellaneous Rough Carpentry.
- .3 Acoustic sealants:
  - .1 Apply one bead under track and one bead under each layer of gypsum board.
  - .2 Apply one bead of acoustic sealant continuously around periphery of each face of partitions to seal gypsum board/structure junction where partitions abut fixed building components.
  - .3 Apply sealant around penetrating mechanical and electrical work to maintain sound rating.
  - .4 Locate sealant so that it is covered after finishes are applied.
  - .5 Construct fire-rated assemblies using fire stopping sealant applied after acoustic sealant.
- .4 Install acoustical batt insulation in accordance with Section 07 21 16 - Blanket Insulation.
- .5 Install gypsum board in accordance with ASTM C840.

- .6 Install gypsum sheathing to ASTM C1280.
- .7 Secure gypsum board to framing without damaging gypsum board edges or ends.
- .8 Apply single or double-layer gypsum board to metal furring or framing using screw fasteners. Maximum screw spacing 300 mm on-centre.
  - .1 Single-layer application:
    - .1 Apply gypsum board on ceilings before application of walls.
    - .2 Apply gypsum board on walls vertically or horizontally, providing sheet lengths to minimize number of board edges or end joints.
  - .2 Double-layer application:
    - .1 Install gypsum board for base layer and exposed gypsum board for face layer.
    - .2 Apply base layer to ceilings before base layer application on walls; apply face layers in same sequence. Offset joints between layers minimum 250 mm.
    - .3 Apply base layers at right angles to supports unless otherwise indicated.
    - .4 Apply base layer on walls and face layers vertically with joints of base layer over supports and face layer joints offset minimum 250 mm with base layer joints.
- .9 Apply single or double-layer gypsum board to concrete or concrete masonry surfaces, using laminating adhesive.
  - .1 Comply with gypsum board manufacturer's recommendations.
  - .2 Brace or fasten gypsum board until adhesive has set.
  - .3 Mechanically fasten gypsum board at top and bottom of each sheet.
- .10 Install ceiling boards in direction to minimize number of end-butt joints. Stagger end joints at least 250 mm.
- .11 Apply water-resistant gypsum board where wall tiles or epoxy paint coating to be applied as indicated on Drawings. Apply water-resistant sealant to edges, ends, and cut-outs which expose gypsum core, and to fastener heads. Do not apply joint treatment on areas to receive tile finish.
- .12 Install gypsum board with face side outwards.
- .13 Do not install damaged or damp boards, or boards with evidence of mould growth.
- .14 Curved substrates:
  - .1 Install two layers of 6.4 mm thick panels horizontally where practical across curved surface plus an additional 300 mm straight area on both ends of curves where possible. Feather between 12.8 mm thickness and adjacent straight wall 15.9 mm thickness as required for smooth and seamless finish.
  - .2 Comply with panel manufacturer's recommendations for minimum curving radius and curving recommendations.

### 3.04 ACCESSORY INSTALLATION

- .1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150 mm on-centre using contact adhesive for full length.
- .2 Install casing beads around perimeter of suspended ceilings unless other trim is specified in Section 09 51 13 – Acoustical Panel Ceilings.
- .3 Install casing beads where gypsum board butts against surfaces without trim concealing junction and where indicated. Seal joints with sealant.
- .4 Install insulating gasket strips continuously at edges of gypsum board at casing beads abutting mechanical wall radiators and where indicated on Drawings, to provide an acoustical break.
- .5 Control and expansion joints:
  - .1 Construct control joints of preformed units set in gypsum board facing and supported independently on both sides of joint.
  - .2 Provide continuous polyethylene dust barrier behind and across control joints.
  - .3 Locate control at maximum 9 m spacing on partitions and ceilings.
  - .4 Locate control joints to coincide with the corner of a door, window, or screen frame.
  - .5 Construct control and expansion joints to maintain sound-rated construction and fire ratings.
- .6 Splice corners and intersections together and secure to each member with three screws.
- .7 Install access doors to electrical and mechanical fixtures specified in respective sections and in accordance with Section 08 31 00 - Access Doors and Panels.
  - .1 Rigidly secure frames to furring or framing systems.

### 3.05 FINISHING

- .1 Finish face panel joints and interior angles with joint system consisting of joint compound, joint tape, and taping compound installed in accordance with manufacturer's instructions and feathered out onto panel faces.



- .2 Gypsum Board Finish: Finish gypsum board walls and ceilings to the following levels in accordance with ASTM C840.
  - .1 Levels of finish:
    - .1 Level 0: No taping, finishing, or accessories required.
      - .1 Locations: N/A
    - .2 Level 1: Joints and interior angles to have tape embedded in joint compound. Excess joint compound, tool marks, and ridges are acceptable.
      - .1 Locations: As scheduled.
    - .3 Level 2: Joints and interior angles to have tape embedded in joint compound and immediately wiped clean with a joint knife or trowel leaving a thin coating of joint compound over the joints and interior angles. Cover fastener heads and accessories with a coat of joint compound. Surfaces to be free of excess joint compound; tool marks and ridges are acceptable.
      - .1 Locations: As scheduled.
    - .4 Level 3: Joints and interior angles to have tape embedded in joint compound and immediately wiped clean with a joint knife or trowel leaving a thin coating of joint compound over the joints and interior angles. Apply one additional coat of joint compound over joints and interior angles. Cover fastener heads and accessories with two separate coats of joint compound. Surfaces to be smooth and free of tool marks and ridges.
      - .1 Locations: As scheduled.
    - .5 Level 4: Embed tape for joints and interior angles in joint compound and immediately wiped clean with a joint knife or trowel leaving a thin coating of joint compound over the joints and interior angles. Apply two separate coats of joint compound over flat joints. Apply one separate coat of joint compound over interior angles. Cover fastener heads and accessories with three separate coats of joint compound. Surfaces to be smooth and free of tool marks and ridges.
      - .1 Locations: As scheduled.
    - .6 Level 5: Embed tape for joints and interior angles in joint compound and immediately wiped clean with a joint knife or trowel leaving a thin coating of joint compound over the joints and interior angles. Apply two separate coats of joint compound over flat joints. Apply one separate coat of joint compound over interior angles. Cover fastener heads and accessories with three separate coats of joint compound. Apply a thin skim coat of joint compound or a material manufactured especially for this purpose to the entire surface. Surfaces to be smooth and free of tool marks and ridges.
      - .1 Locations: As scheduled.
  - .3 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent uncoated surface of gypsum board.
  - .4 Skim coating:
    - .1 Mix joint compound slightly thinner than for joint taping.

- .2 Apply thin coat to entire surface using trowel or drywall broad knife to fill surface texture differences, variations, or tool marks.
- .3 Allow skim coat to dry completely.
- .4 Remove ridges by light sanding or wiping with damp cloth.

### 3.06 TOLERANCES

- .1 Maximum variation of finished gypsum board surface from true flatness: 3 mm in 3000 mm in any direction.

### 3.07 CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning, and:
  - .1 Completely remove joint compounds from concrete floors.

### 3.08 SCHEDULES

- .1 Gypsum Board and Panel Material Schedule:
  - .1 Type 1: Water-resistant fibre-reinforced gypsum backing board.
    - .1 Application: Walls in washrooms behind tile finish.
    - .2 Type X where required to maintain existing fire separations.
    - .3 Finish level: 2.
  - .2 Type 2: Acoustic gypsum board.
    - .1 Application: All walls indicated on Drawings to have STC rating.
    - .2 Type X for greater acoustic performance.
    - .3 Finish level: 4 unless otherwise specified to be higher.
  - .3 Type 3: Gypsum wallboard.
    - .1 Application: All walls not included in types 1 and 2.
    - .2 Type X where required to maintain existing fire separations.
    - .3 Finish level: 4 unless otherwise specified to be higher.
  - .4 Location of level 5 finish:
    - .1 All locations indicated on Drawings to receive PT-C finish.
  - .5 Type 1, 2 and 3 walls that extend between ceiling and underside of floor slab above to maintain minimum level 3 finish above ceilings to ensure adequacy of sound separation between rooms.
- .2 Reveal Trim Schedule:
  - .1 Fry Reglet Z-Reveal Molding around all new hollow metal door frames. Refer to door schedule in Drawings.
    - .1 Locate reveal trim on corridor side of walls, along both jambs and head of frame.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 06 10 53 – Miscellaneous Rough Carpentry
- .2 Section 07 92 00 - Joint Sealants
- .3 Section 09 21 16 – Gypsum Board Assemblies

### **1.02 REFERENCE STANDARDS**

- .1 ASTM International (ASTM)
  - .1 ASTM C645-14e1, Standard Specification for Nonstructural Steel Framing Members.
  - .2 ASTM A653/A653M-07, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process.
  - .3 ASTM C754-15, Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- .2 Underwriter's Laboratories (UL)
  - .1 UL-2768-2011, Architectural Surface Coatings.
- .3 The Master Painters Institute (MPI)
  - .1 Architectural Painting Specification Manual-current edition.
    - .1 MPI #26, Primer, Galvanized Metal, Cementitious.

### **1.03 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for metal framing and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit one (1) digital copy of WHMIS SDS in accordance with Section 01 35 29 - Health, Safety, and Emergency Response Procedures.

### **1.04 QUALITY ASSURANCE**

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

### **1.05 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

- .2 Delivery and Acceptance Requirements: deliver materials to Site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect metal framing from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

## **2 PRODUCTS**

### **2.01 MATERIALS**

- .1 Non-load bearing channel stud framing: to industry standards and best practices for this project's application.
  - .1 Knock-out service holes at 460 mm centres.
- .2 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, to industry standards and best practices for this project's application and as follows:
  - .1 Slotted Deflection Track for Fire Separations: Premanufactured slotted top runner with 63 mm down standing legs and having 6 mm wide x 38 mm high slots spaced at 25 mm on centre along length of runner; tested and certified for use in fire rated wall construction.
  - .2 Double Runner Deflection Track: Outside runner using 50 mm or 75 mm flanges; inner runner 33 mm; maintaining 25 mm minimum deflection space.
  - .3 Deep Leg Deflection Track: Top runner having 50 mm or 75 mm down standing legs; maintaining 13 mm minimum deflection space.
  - .4 Base Runner: Bottom track with 33 mm upstanding legs.
- .3 Furring Channels: To industry standards and best practices for this project's application and commercial steel sheet in accordance with ASTM A653, Z180, hot dipped zinc-coated (galvanized), as follows:
  - .1 Hat Shaped, Rigid Furring Channels: ASTM C645, 0.75 mm thickness x 22 mm deep.
  - .2 Resilient Furring Channels: 0.46 mm thickness x 13 mm deep members designed to reduce sound transmission having asymmetrical face attached to single flange by a slotted leg (web).
- .4 Curving Tracks: To industry standards and best practices for this project's application and commercial steel sheet with ASTM A653, Z180, hot dipped zinc-coated (galvanized), complete with flexible sliding straps to allow for curvature indicated on drawings; width to suit framing, and as follows:
  - .1 Width: 92 mm.
  - .2 Minimum base metal thickness: 0.75 mm.
- .5 Metal channel stiffener: To industry standards and best practices for this project's application and coated with rust inhibitive coating.

- .6 Acoustical sealant: in accordance with Section 07 92 00 - Joint Sealants.
- .7 Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, 12 mm wide, with self sticking adhesive on one face, lengths as required.

### **3 EXECUTION**

#### **3.01 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for non-structural metal framing application in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate.
  - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation after unacceptable conditions have been remedied.

#### **3.02 ERECTION**

- .1 Erect partitions in accordance with framing requirements of ASTM C754.
- .2 Align partition tracks at floor and ceiling and secure at 610 mm on centre maximum.
- .3 Place studs vertically at 406 mm on centre and not more than 50 mm from abutting walls, and at each side of openings and corners.
  - .1 Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.
- .4 Erect metal studding to tolerance of 1:1000.
- .5 Attach studs to bottom track using screws, crimp method, or pop rivets.
- .6 Co-ordinate simultaneous erection of studs with installation of service lines. Align web openings when erecting studs.
- .7 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.
- .8 Co-ordinate erection of studs with installation of Acoustic Sealant as specified in other Sections.
- .9 Provide one of the following, extending from floor to ceiling at each side of openings wider than stud centres specified:
  - .1 Install two studs. Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.
  - .2 Install heavy gauge (0.91 mm thick steel sheet minimum) single jamb studs at openings.
- .10 Provide the following above all demountable wall locations:
  - .1 Install 45-degree light gauge metal stud angle bracing minimum one (1) side of bulkhead wall framing at maximum 1200 mm on center above ceiling plane.
  - .2 Coordinate exact location in field around other system components.

- .3 In select locations, attachment to a perpendicular wall can be considered acceptable bracing in lieu of light gauge metal stud angle bracing, provided the 1200 mm spacing is not exceeded.
- .4 Consultant and Authority Having Jurisdiction (AHJ) reserve the right to require additional angled bracing, should it be determined that it is required for rigidity and safety.
- .11 Erect track at head of door/window/glass front openings and sills of sidelight/window openings/wall-mounted heaters or other obstructions to accommodate intermediate studs.
  - .1 Secure track to studs at each end, in accordance with manufacturer's instructions.
  - .2 Install intermediate studs above and below openings in same manner and spacing as wall studs.
- .12 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.
- .13 Provide 40 mm stud or furring channel secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions, unless wood blocking is provided in stud cavity in accordance with Section 06 10 53 – Miscellaneous Rough Carpentry.
- .14 Install steel studs or furring channel between studs for attaching electrical and other boxes.
- .15 Extend partitions to ceiling height except where noted otherwise on drawings.
- .16 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs.
- .17 Install continuous insulating strips to isolate studs from uninsulated surfaces.
- .18 Install continuous beads of acoustical sealant under studs and tracks around perimeter of sound control partitions, as outlined in Section 09 21 16 – Gypsum Board Assemblies.
- .19 Curved Partition Tracks:
  - .1 Cut top and bottom track (runners) through leg and web at 50 mm intervals for arc length. In cutting lengths of track, allow for uncut straight lengths minimum 300 mm at ends of arcs. Shape curving tracks to profiles indicated on drawings in accordance with manufacturer's instructions.
  - .2 Bend track to uniform curve and locate straight lengths so they form a true tangent to arcs.
  - .3 Support outside (cut) leg of track by clinching steel sheet strip, 25 mm high, by thickness of track metal, to inside of cut legs using metal lock fasteners.
  - .4 Begin and end arc with a stud and space intermediate studs equally along arcs at stud spacing recommended in writing by gypsum board manufacturer for radii indicated. On straight lengths of minimum two (2) studs at ends of arcs, place studs at 150 mm on centre.

**3.03 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

**3.04 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by non-structural metal framing application.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 07 92 00 - Joint Sealants
- .2 Section 09 21 16 - Gypsum Board Assemblies

### **1.02 DEFINITIONS**

- .1 N/A

### **1.03 REFERENCE STANDARDS**

- .1 American National Standards Institute (ANSI):
  - .1 ANSI A108/A118/A136.1 2024, American National Specifications for the Installation of Ceramic Tile
  - .2 ANSI A137.1:2022, American National Standard Specifications for Ceramic Tile
  - .3 ANSI A137.2:2022, American National Specifications for Glass Tile
  - .4 ANSI A326.3-2021, American National Standard Test Method for Measuring Dynamic Coefficient of Friction of Hard Surface Flooring Materials
- .2 ASTM International (ASTM):
  - .1 ASTM C97/C97M-18, Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone
  - .2 ASTM C207-24, Standard Specification for Hydrated Lime for Masonry Purposes
  - .3 ASTM C373-18, Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products
  - .4 ASTM C627-18, Standard Test Method for Evaluating Ceramic Floor Tile Installation Systems Using the Robinson-Type Floor Tester
  - .5 ASTM C1027-19, Standard Test Method for Determining Visible Abrasion Resistance of Glazed Ceramic Tile
  - .6 ASTM C1325-22e1, Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units
- .3 CSA Group (CSA):
  - .1 CSA A3000-18, Cementitious materials compendium
  - .2 CSA B651-18, Accessible design for the built environment
  - .3 CSA/ASC B651:23, Accessible design for the built environment
- .4 Green Seal (GS):
  - .1 GS-11-21, Paints, Coatings, Stains, and Sealers
  - .2 GS-36-13, Adhesives for Commercial Use



- .5 International Organization for Standardization (ISO):
  - .1 ISO 10545 Series, Ceramic tiles
  - .2 ISO 10545-3:2018, Ceramic tiles – Part 3: Determination of water absorption, apparent porosity, apparent relative density and bulk density
  - .3 ISO 10545-4:2019, Ceramic tiles – Part 4: Determination of modulus of rupture and breaking strength
  - .4 ISO 10545-7:1996, Ceramic tiles – Part 7: Determination of resistance to surface abrasion for glazed tiles
  - .5 ISO 10545-13:2016, Ceramic tiles – Part 13: Determination of chemical resistance
  - .6 ISO 10545-14:2015, Ceramic tiles – Part 14: Determination of resistance to stains
  - .7 ISO 13006:2018, Ceramic tiles – Definitions, classification, characteristics and marking
  - .8 ISO 13007-1:2014, Ceramic tiles – Grouts and adhesives – Part 1: Terms, definitions and specifications for adhesives
- .6 Terrazzo, Tile and Marble Association of Canada (TTMAC):
  - .1 TTMAC Hard Surface Maintenance Guide (2017-2019)
  - .2 TTMAC Tile Installer Technical Handbook, (2023-2024)
- .7 Tile Council of North America (TCNA):
  - .1 TCNA Handbook for Ceramic, Glass, and Stone Tile Installation, 2024

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- .1 N/A

#### **1.05 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product data: Product literature and data sheets, including product characteristics, performance criteria, physical sizes, finishes, slip resistance and limitations.
  - .1 Submit product data for:
    - .1 each type of tile
    - .2 primers
    - .3 mortars
    - .4 adhesives
    - .5 grout
    - .6 crack isolation membranes
    - .7 straight edge and transition strips
    - .8 sealants
    - .9 floor sealers
    - .10 thresholds

- .2 Submit WHMIS SDSs for:
  - .1 primers
  - .2 adhesives
  - .3 sealants
- .3 Samples:
  - .1 Samples for verification: Manufacturer's full size samples to verify specified colours, patterns, textures, and finishes.
    - .1 Submit samples for:
      - .1 each type of tile
      - .2 grout sections
      - .3 straight edge strips
      - .4 transition strips
      - .5 reducer strips
  - .4 Certificates: Where products from more than one manufacturer are used in one tile assembly, submit a statement from setting material manufacturer to certify compatibility of other manufacturers' materials.
  - .5 Manufacturer's instructions:
    - .1 Special delivery, storage, and handling requirements.
    - .2 Installation instructions.
    - .3 Recommended sequencing.
    - .4 Cleaning procedures.
  - .6 Site quality control submittals: Indicate results of tests and inspections specified in SITE QUALITY CONTROL in this section.

#### **1.06 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and maintenance data:
  - .1 Include, in the operation and maintenance manual, manufacturer's maintenance instructions and recommended cleaning materials and methods.
    - .1 Indicate specific warnings for maintenance materials or practices that might damage tile work.
  - .2 Submit TTMAC Hard Surface Maintenance Guide, in digital format and hardcopy format if requested by Owner's representative.

#### **1.07 MAINTENANCE MATERIAL SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Extra stock materials:
  - .1 Supply minimum 2% of each type and colour of installed tile.

- .2 Supply extra stock materials from the same production run as installed materials.

## **1.08 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Installers:
    - .1 Minimum five (5) years documented acceptable experience in the installation of floor and wall tile, with a minimum of five (5) projects of similar scale within the past five (5) years.
    - .2 Provide written documentation of experience if requested by Consultant.

## **1.09 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements, and:
  - .1 Examine materials upon delivery. Open boxes and confirm materials match reviewed samples, are free from defects or damage detrimental to final appearance and installation. Tile materials factory marked as seconds or that are not consistent with materials submitted for review are not acceptable.
  - .2 Verify tiles with colour/pattern variations were blended at the factory, so tile units taken from one package show the same range of colours/patterns as those taken from other packages. If tiles are packaged without factory blending, blend tiles on site before installation.
  - .3 Store cementitious materials indoors, in dry location, protected from foreign materials.
  - .4 Protect adhesives, fillers, and sealants from freezing.

## **1.10 SITE CONDITIONS**

- .1 Ambient conditions:
  - .1 Maintain air temperature and substrate temperatures at tile installation area above 12 °C for 48 hours before, during, and 48 hours after installation.
  - .2 Install tiles at temperatures between 12 °C and 38 °C.
  - .3 Install epoxy mortar and grouts at temperatures between 15 °C and 25 °C.
  - .4 Provide additional heat when there is a risk surface temperatures may drop below manufacturer's recommended temperatures.

## **2 PRODUCTS**

### **2.01 COMMON PRODUCT REQUIREMENTS**

- .1 Provide floor tile products manufactured and tested in accordance with ANSI A108/A118/A136.1, ANSI A137.1 or ISO 10545 Series.

## 2.02 FLOOR & WALL TILE

- .1 Type TL-1: Ceramic Tile:
  - .1 Basis of Design: Centura, RAL Vision
    - .1 Size: Nominal 100 mm × 300 mm.
    - .2 Sheen: Gloss
    - .3 Colour: White
  - .2 Accepted equivalents.
- .2 Type TL-2: Ceramic Tile:
  - .1 Basis of Design: Centura, RAL Vision
    - .1 Size: Nominal 100 mm × 300 mm.
    - .2 Sheen: Gloss
    - .3 Colour: As selected by Owner and Consultant from Manufacturer's full standard range
  - .2 Accepted equivalents.
- .3 Type TL-3: Ceramic floor tile
  - .1 Basis of Design: Centura, Subway
    - .1 Size: Nominal 600 mm × 600 mm.
    - .2 Colour: Ash
  - .2 Accepted equivalents.

## 2.03 MORTAR, ADHESIVE, AND GROUT MATERIALS

- .1 Primers: Low viscosity primer as recommended by manufacturer to suit substrates and site conditions. Submit proof of bonding ability of setting system if manufacturer says primer is not required.
- .2 Surface preparation materials:
  - .1 Portland cement mortar: Scratch and bond coat, Levelling bed containing the following:
    - .1 Portland cement: To CSA A3000, Type GU.
    - .2 Hydrated lime: To ASTM C207, Type as recommended by Manufacturer.
    - .3 Sand: To ASTM C144, passing 1.18 mm sieve.
    - .4 Water: Potable, free of minerals and chemicals which are detrimental to mortar and grout mixes.
  - .2 Self-levelling and smoothing underlayment: To ANSI A108.01, Type 2, cementitious self-leveling smoothing underlayment, capable of a feather edge. Products containing gypsum are not acceptable.
    - .1 Acceptable products:
      - .1 Planipatch, by Mapei Inc.

- .2 TEC VersaPatch TA-327, by H.B Fuller Construction Products Inc.
  - .3 Laticrete 816 Latipatch Rapid Underlayment, by Laticrete International Inc.
  - .4 ARDEX Liquid BackerBoard Underlayment, by Ardex Engineered Cements.
  - .5 Other acceptable equivalent products.
- .3 Wall tile systems:
  - .1 Thin set interior installations: To ANSI A118.1, dry set mortar, formulated for thin set applications, factory sanded mortar consisting of Portland cement, sand, and additives requiring only addition of potable water for installation with bond enhancing latex additive.
- .4 Floor tile systems:
  - .1 Large Format Tile set interior installations: To ANSI A118.4, latex-Portland cement mortar, rated for specified floor traffic loadbearing performance.
    - .1 Ensure compatibility between mortar and crack isolation membrane.
    - .2 Acceptable products:
      - .1 Ultraflex LFT by Mapei Inc.
      - .2 Laticrete 220/333, by Laticrete International Inc.
      - .3 TEC Ultimate Large Tile Mortar 382/383, by H.B Fuller Construction Products Inc.
      - .4 ProLite Tile and Stone Mortar, by Custom Building Products.
      - .5 ARDEX X77 MICROTEC Fibre-Reinforced Thin Set Mortar, by Ardex Engineered Cements.
      - .6 Other acceptable equivalent products.
- .5 Adhesive systems:
  - .1 Organic adhesive: To ANSI A136.1, CGSB 71-GP-22M, Type 1, thin set wall tile adhesive system; non-flammable, water-resistant, latex adhesives, recommended for interior applications.
    - .1 Acceptable Products:
      - .1 Ultra/Mastic 1 by Mapei Inc.
      - .2 TEC TA-101 Adhesive, by H.B Fuller Construction Products Inc.
      - .3 Latamastic 9, by Laticrete International Inc.
      - .4 TripleGrip, by Custom Building Products.
      - .5 ARDEX D14 Premixed Tile Adhesive, by Ardex Engineered Cements.
      - .6 Other acceptable equivalent products.

- .6 Grout: With non-fading pigments.
  - .1 Epoxy grout: To ANSI A118.3, ANSI A118.6, water-cleanable, chemical-resistant, factory blended modified Portland cement compound, 100% epoxy additives and hardeners.
    - .1 Acceptable Products:
      - .1 Kerapoxy, by Mapei Inc.
      - .2 SpectraLOCK PRO, by Laticrete International Inc.
      - .3 TEC AccuColor EFX, by H.B Fuller Construction Products Inc.
      - .4 CEG 2000, by Custom Building Products.
      - .5 ARDEX WA Epoxy Grout/Adhesive, by Ardex Engineered Cements.
      - .6 Other acceptable equivalent products.
    - .2 Grout colours: As selected by Consultant from manufacturer's samples.

#### 2.04 MIXES

- .1 Mix premanufactured mortars and grouts in accordance with ANSI A108/A118/A136.1, and mortar and grout manufacturers' instructions. Perform site mixing to add water only.
- .2 Mix thoroughly to smooth, homogeneous consistency. Avoid air entrapment and prolonged mixing.
- .3 Let slake ten (10) to fifteen (15) minutes. Re-stir without adding liquid.

#### 2.05 ACCESSORIES

- .1 Crack isolation membranes: To ANSI A108.01 and ANSI A118.12, loadbearing, liquid-applied, lightweight fabric reinforced membrane. Thickness recommended by manufacturer to accommodate in-plane substrate movement of two (2) mm in thin set application.
  - .1 For use at all floor tile locations.
  - .2 Acceptable Products:
    - .1 Mapelastic PRP-M19, by Mapei Inc.
    - .2 Laticrete Blue 92 Anti-Fracture Membrane, by Laticrete International Inc.
    - .3 TEC Triple Flex TA-324, by H.B Fuller Construction Products Inc.
    - .4 Other acceptable equivalent products.
- .2 Latex additive: Formulated for use in Portland cement mortars and grouts.
- .3 Water: Potable, clean, and free of chemicals and contaminants detrimental to mortar and grout mixes.
- .4 Straight edge, transition strips and thresholds: Purpose made with integral perforated anchoring leg for setting transition strip into setting material, with manufacturer's alignment connector and end pieces.
  - .1 Material: Clear anodized extruded aluminum.

- .2 Profile: As selected by the Consultant from Manufacturer's samples, based on Manufacturer's recommended type for each type of adjacent flooring.
- .3 Height: In accordance with CSA B651, CSA/ASC B651, and as required to suit tile and adjacent floor finish installations.
- .5 Sealants: Neutral-cure, non-sag, 100% silicone sealant, mold and mildew resistant, in accordance with Section 07 92 00 - Joint Sealants.
  - .1 Colour: Match adjacent grout colour.
  - .2 Acceptable Products:
    - .1 ARDEX SX Silicone Sealant, by Ardex Engineered Cements.
    - .2 TEC 100% Silicone, by H.B Fuller Construction Products Inc.
    - .3 Other acceptable equivalent products.
- .6 Tile Grout Release Sealer: Water-based silicone, pre-grout sealer.
  - .1 Acceptable products:
    - .1 511 H2O Water Base Penetrating Sealer, by Miracle Sealants Company.
    - .2 GroutRite, by H.B Fuller Construction Products Inc..
    - .3 Aquamix Penetrating Sealer, by Custom Building Products.
    - .4 Other acceptable equivalent products.

### 3 EXECUTION

#### 3.01 EXAMINATION

- .1 Verification of conditions:
  - .1 Verify substrate and project conditions in accordance with Section 01 71 00 - Examination and Preparation, and:
    - .1 Verify concrete slabs are sufficiently dry to bond with adhesive, in accordance with manufacturers' recommended bond and moisture test methods.
    - .2 Examine substrates and conditions where tile will be installed for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
    - .3 Verify substrates for bonding tile are firm, dry, clean, and free from oil, waxy films, and curing compounds.
    - .4 Verify installation of grounds, anchors, recessed frames, electrical and mechanical items, and similar products located in, behind, or through tiling is complete.
    - .5 Verify substrate and backing surface flatness tolerances. Existing conditions need to be reviewed and are considered the starting flatness for work of this section:
      - .1 Large format floor tile: Tiles with any side greater than 380 mm require minimum FF50, equivalent to 3 mm with maximum two gaps under 3000 mm straightedge.

- .2 Standard format wall tile: Tiles from 100 mm × 100 mm, with all sides less than 380 mm require minimum FF35, equivalent to 5 mm with maximum two gaps under a 3000 mm straightedge.
- .2 Pre-installation testing:
  - .1 Test concrete substrates in accordance with ASTM F2170.
    - .1 Confirm manufacturer's acceptable relative humidity before testing.
    - .2 Conduct moisture tests on concrete slabs, one test per 3 square metres (m<sup>2</sup>) of floor area.
    - .3 Maintain a minimum substrate temperature of 13 °C during testing.

### 3.02 PREPARATION

- .1 Thoroughly clean substrate surfaces. Remove grease, oil, dust film, concrete surface film-forming products, concrete curing agents, and other contaminants that could reduce adhesion within bonding systems.
  - .1 Clean the back of each tile before installation to remove surface contaminants, cutting residue, firing release dust, and other debris detrimental to bond and final surface appearance.
- .2 Crack Suppression membrane: Install membranes in accordance with TTMAC Tile Installer Technical Handbook and membrane manufacturers' instructions.
- .3 Surface levelling: Apply self-levelling mortar to make backing surfaces flat and true to tolerances in plane listed for performance requirements:
  - .1 Install levelling materials at slight substrate irregularities.
  - .2 Provide self-levelling materials for thicknesses less than 8 mm where thin set tile methods are used.
  - .3 Provide mortar bed levelling materials for thicknesses 8 mm and greater.

### 3.03 GENERAL INSTALLATION REQUIREMENTS

- .1 Perform tile work in accordance with TTMAC Tile Installer Technical Handbook and ANSI A108/A118/A136.1.
- .2 Lay tile in patterns indicated on Drawings or indicated by Consultant in writing and:
  - .1 Align joints when adjoining tiles on floor, base, walls, and trim are the same size.
  - .2 Lay out tile work and centre tile sites in both directions in each space or on each wall area.
  - .3 Minimum tile width is one-third unit size.
  - .4 Adjust tile layout to minimize tile cutting.
  - .5 Make joints between tile uniform, plumb, straight, true, and flush with adjacent tile.
- .3 Extend tiles into recesses and under equipment and fixtures to create a complete uninterrupted floor covering and wall covering.
  - .1 Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.



- .2 Do not split tile.
- .3 Cut edges smooth, even, and free from chips.
- .4 Fit tiles around corners, fitments, fixtures, drains, and other built-in objects. Accurately form intersections and returns.
  - .1 Fit tiles closely to electrical outlets, piping, fixtures, and other penetrations so that plates, collars, and covers overlap tile.
- .5 Cut and drill tile accurately and without damage.
  - .1 Carefully grind exposed cut tile edges or tile edges abutting trim, finishes, or built-in items for straight aligned joints.
- .6 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .7 Slope floor tile towards floor drains in thick-bed mortar installations.
- .8 Tile set in mortar beds: Wait minimum 24 hours after tile installation before grouting.
- .9 Bonding bed installation: Set tile in place while bond coat is wet and tacky.
  - .1 Apply a coat of mortar with pressure using the trowel's flat side to key the mortar into the substrate. Apply additional mortar, combing it in a single direction parallel to the tile's shortest dimension, with the trowel's notched side.
  - .2 Back butter larger tiles and installations with moderate or higher loadbearing performance requirements.
  - .3 Place tiles firmly into the wet mortar. Push tiles back and forth, perpendicular to trowel lines, to collapse mortar ridges and help achieve maximum coverage.
  - .4 Verify corners and edges are fully supported by bonding material. Periodically pick up and inspect freshly installed tiles.
  - .5 Set tiles to prevent lippage greater than 1 mm over a 3 mm grout joint.
  - .6 Keep two-thirds of grout joint depth free of bonding materials.
  - .7 Clean excess bonding materials from tile surface before bonding materials' final set.
  - .8 Sound tiles after bonding materials have cured. Replace hollow sounding tiles before grouting.
- .10 Back buttering:
  - .1 Achieve 100% mortar coverage of tile in accordance with TTMAC Tile Installer Technical Handbook, TCNA Handbook for Ceramic, Glass, and Stone Tile Installation and ANSI A108/A118/A136.1 for:
    - .1 Tiles at exterior locations.
    - .2 Tiles at shower areas.
    - .3 Tiles installed with chemical-resistant mortars and grouts.
    - .4 Tiles with any side 300 mm or larger.
    - .5 Tiles with raised or textured backs.
    - .6 Tile installation areas rated for heavy or extra heavy duty.

- .7 Porcelain tiles with more than 20% of the tile back covered with firing release dust.
- .8 Back buttered tiles with adhesive mortar rated in accordance with ASTM C627, extra heavy duty rating (passing cycles 1 through 14).
- .11 Tolerances:
  - .1 Maximum surface tolerance: 1:800.

### 3.04 ACCESSORY INSTALLATION

- .1 Install straight edge or transition strips as indicated on Drawings and where floor tiling edge abuts different floor finishes. Provide sloped profile transition strips where uneven transitions occur between 6 mm and 13 mm.

### 3.05 GROUT INSTALLATION

- .1 Install grout in accordance with manufacturer's instructions, and the TTMAC Tile Installer Technical Handbook.
  - .1 Allow proper setting time before application of grout.
  - .2 Pre-seal or wax tiles that require protection from grout staining.
  - .3 Force grout into the joints with a rubber grout float. Make sure all joints are well-compacted and free of voids and gaps.
  - .4 Remove excess grout in accordance with manufacturer's instructions and polish tile with clean cloths.

### 3.06 CONTROL JOINTS

- .1 Provide control joints around perimeter of large areas, around columns, in locations where area changes direction and where tile abuts other hard material. Place control joints directly over subfloor expansion/control joints.
- .2 Provide caulked joints at all internal wall corners and between wall and floor tile.

### 3.07 SITE QUALITY CONTROL

- .1 Site tests and inspections:
  - .1 Perform in accordance with Section 01 45 00 - Quality Control.
  - .2 Confirm tile is set flush and level with adjacent tiles.
  - .3 Identify broken, cracked, hollow sounding, and damaged tiles.
  - .4 Confirm accessories are installed correctly.
  - .5 Confirm flexible grouting and joint sealants are installed correctly.
  - .6 Confirm installation is complete and in accordance with this section.

### 3.08 CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning, and:
  - .1 Clean tile surfaces so they are free of foreign matter using manufacturer recommended cleaning products and methods after completing grouting.

- .2 Remove grout residue from tile as soon as possible.
- .3 Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's instructions, but no sooner than ten (10) days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acidic solution cleaning.
- .4 Flush surface with clean water before and after cleaning.

### 3.09 PROTECTION

- .1 Protect partially installed and completed work from damage in accordance with Section 01 76 00 - Protecting Installed Construction, and:
  - .1 Protect finished tile floor areas from traffic until setting materials have sufficiently cured in accordance with TTMAC Tile Installer Technical Handbook.
  - .2 Prevent foot and wheel traffic from tile floors for minimum seventy-two (72) hours after completion of grouting.
  - .3 Use stepping boards where access is required for light foot traffic only after twenty-four (24) hours from completion of grouting.
  - .4 Protect tile flooring from water immersion for minimum twenty-one (21) days after completion of tile work.
  - .5 Protect wall tiles and bases from impact, vibration, and heavy hammering on adjacent and opposite walls for a minimum of fourteen (14) days after installation.

### 3.10 SCHEDULES

- .1 Tile Schedule: Refer to Drawings.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 09 84 00 – Acoustic Room Components
- .2 Section 09 21 16 – Gypsum Board Assemblies
- .3 Section 09 91 23 – Interior Painting

### **1.02 DEFINITIONS**

- .1 Articulation Classification (AC): Indication of attenuation of sound being reflected from ceiling materials to adjacent areas in open plan areas, in accordance with ASTM E1111/E1111M.
- .2 Ceiling Attenuation Class (CAC): Indication of amount of attenuation of sound passing up through a panel through the open plenum and back down through a panel into adjacent spaces where a partition is not full height, in accordance with ASTM E1414/E1414M.
- .3 Light Reflectance (LR): The percentage amount of light returned from the surface of a material compared to the source.
- .4 Noise Reduction Coefficient (NRC): Measure of the absorption of sound energy over four frequencies. An indication of the amount of noise a panel can absorb - measured in 0.05 increments in accordance with ASTM C423.
- .5 Sound Absorption Average (SAA): Measure of the absorption of sound energy over twelve frequencies. An indication of the amount of sound a panel can absorb - measured in 0.01 increments in accordance with ASTM C423.

### **1.03 REFERENCE STANDARDS**

- .1 ASTM International (ASTM):
  - .1 ASTM A580/A580M-18, Standard Specification for Stainless Steel Wire
  - .2 ASTM A641/A641M-19, Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
  - .3 ASTM C423-17, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
  - .4 ASTM C635/C635M-17, Standard Specifications for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings
  - .5 ASTM C636/C636M-19, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels
  - .6 ASTM E1111/E1111M-14, Standard Test Method for Measuring the Interzone Attenuation of Open Office Components
  - .7 ASTM E1264-19, Standard Classification for Acoustical Ceiling Products
  - .8 ASTM E1414/E1414M-21a, Standard Test Method for Airborne Sound Attenuation between Rooms Sharing a Common Ceiling Plenum

- .9 ASTM E1477-98a, Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers
- .10 ASTM F1667-18a Standard Specification for Driven Fasteners: Nails, Spikes and Staples
- .2 Ceilings & Interior Systems Construction Association (CISCA):
  - .1 Ceiling Systems Handbook, 2019
- .3 ULC Standards (ULC):
  - .1 CAN/ULC-S102-10, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
  - .2 CAN/ULC-S702.1-14, Standard for Mineral Fibre Thermal Insulation for Buildings, Part 1: Material Specification

#### **1.04 COORDINATION**

- .1 Do not begin installation of ceiling suspension system until work above ceiling has been reviewed by Consultant and Authority Having Jurisdiction.
- .2 Coordinate ceiling work to accommodate components of other Sections built into acoustical ceilings, including the following:
  - .1 Sprinkler System (specifically elements in acoustical panel ceilings)
  - .2 Acoustical Air Plenums
  - .3 Diffusers, Registers and Grilles (specifically elements in acoustical panel ceilings)
  - .4 Lighting

#### **1.05 SEQUENCING**

- .1 Schedule installation of acoustical panel ceilings to occur after completion of overhead mechanical and electrical work, where possible.
- .2 Begin installation after building envelope, and dust and moisture producing activities are complete.
- .3 Begin installation after walls have been painted with final coat and paint is dry.

#### **1.06 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: Submit manufacturer's installation instructions, product literature, and data sheets for ceiling suspension system, acoustic panels, and system accessories. Include product characteristics, performance criteria, physical sizes, finishes, and limitations.
- .3 Samples for Verification:
  - .1 Submit 150 mm x 150 mm samples of each type of acoustical panel.
  - .2 Submit for review and acceptance of each component specified or necessary for complete installation. Include technical descriptive data.
  - .3 Submit samples of each component proposed for use in each type of ceiling suspension system.

**1.07 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Submit maintenance information for acoustical ceiling systems and incorporate into manual. Include warnings of cleaning methods that may damage finished surfaces.

**1.08 MAINTENANCE MATERIAL SUBMITTALS**

- .1 Supply extra acoustical units in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Supply extra materials from same production run as installed materials.
- .3 Supply acoustical units amounting to 2% of gross ceiling area for each pattern and type of acoustical panel required for Project - minimum one complete factory-sealed package of each.

**1.09 QUALITY ASSURANCE**

- .1 Certifications:
  - .1 Submit manufacturer's product certificates, certifying materials comply with specified performance criteria and physical requirements.
- .2 Manufacturers: Obtain materials for each type of acoustical panel ceiling system (panels and suspension system) from a single manufacturer. Provide products exposed to view from the same production run for each room, with consistent appearance.

**1.10 DELIVERY, STORAGE, AND HANDLING**

- .1 Perform in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Storage and Handling Requirements:
  - .1 Store materials flat, off ground, indoors, and in a clean, dry, and well-ventilated area.
  - .2 Protect acoustical ceiling components from nicks, scratches, and other damage.

**1.11 AMBIENT CONDITIONS**

- .1 Unless manufacturer's recommendations are more restrictive, maintain uniform temperature of 15 to 29 degrees Celsius and relative humidity of 20 to 40% for 48 hours before and during installation.
- .2 Store materials in work area 48 hours before beginning installation.

**1.12 WARRANTY**

- .1 Manufacturer Warranty:
  - .1 Coverage of manufacturing defects in materials and workmanship resulting in failure of suspension system for 30 years from date of Substantial Performance of the Work.

## **2 PRODUCTS**

### **2.01 DESIGN CRITERIA**

- .1 Superimposed Loads: Determine superimposed loads applied to ceiling suspension systems by components of the building and verify that adequate hangers are installed to support additional loads in conjunction with normal loads of the ceiling system, and as follows:
  - .1 Maximum Deflection: Limit deflection to L/360 in accordance with ASTM C635/C635M deflection test.

### **2.02 MATERIALS**

- .1 Classification: Intermediate-Duty system to ASTM C635/C635M

### **2.03 ACOUSTICAL CEILING SUSPENSION**

- .1 Ceiling Suspension System CSS-1: Non-fire rated, made up as follows:
  - .1 Basis of Design:
    - .1 Suprafine XL 9/16" Exposed Tee, Armstrong World Industries, Inc.
  - .2 Other acceptable Manufacturers with equivalent systems:
    - .1 Certainteed
    - .2 USG
    - .3 Other accepted equivalents
- .2 Ceiling Suspension System CSS-1A: Non-fire rated, made up as follows:
  - .1 Basis of Design (Alternative Pricing, see Section 01 23 00):
    - .1 15/16" Vector with 1/4" reveal based on 15/16" Prelude system.
  - .2 Other acceptable Manufacturers with equivalent systems:
    - .1 Certainteed
    - .2 USG
    - .3 Other accepted equivalents
- .3 Ceiling Suspension System CSS-2: Non-fire rated, made up as follows:
  - .1 Basis of Design:
    - .1 Prelude XL 15/16" Exposed Tee, Armstrong World Industries, Inc.
  - .2 Other acceptable Manufacturers with equivalent systems:
    - .1 Certainteed
    - .2 USG
    - .3 Other accepted equivalents
- .4 Materials for Suspension System: commercial quality hot dipped galvanized steel.

- .5 Exposed Tee-Bar Grid Components: Components die cut. Main tee with double web, rectangular bulb and 24 mm rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection in matching colour to main tees.
  - .1 Shop painted satin sheen, white colour, all locations unless otherwise indicated.
  - .2 Shop painted satin sheen, white colour, field paint exposed tee where specified in Schedule.
- .6 Hanger Wire: To ASTM A641/A641M, galvanized soft annealed steel wire:
  - .1 Access Panel Ceilings: Minimum 3.6-mm diameter
  - .2 Other Ceilings: Minimum 2.6-mm diameter
- .7 Hanger Inserts: Purpose made.
- .8 Carrying Channels: 38 mm x width as required by manufacturer channel, galvanized steel, as required to suspend ceiling with continuous support at interferences between ceiling suspension and other building components.
- .9 Accessories:
  - .1 Splices, clips, wire ties, retainers and edge wall moulding flush to complement suspension system components, and as recommended by system manufacturer.
  - .2 Basis of Design: AXIOM Trim & Transitions, Armstrong World Industries, Inc.
    - .1 AXIOM Transitions Exposed Tee 9/16" Shadow Reveal Transition Molding Straight for all locations between drywall ceilings and acoustic panel tile ceilings. Refer to Drawings and Section 01 23 00 – Alternatives.
    - .2 Pre-formed or flexible curved Perimeter Trim: As required

## 2.04 ACOUSTICAL CEILING PANELS

- .1 Acoustical Panel AP-1: To ASTM E1264 and as follows: Open office spaces
  - .1 Basis of Design: Optima, Armstrong World Industries, Inc.
    - .1 Other acceptable Manufacturers with equivalent systems:
      - .1 CertainTeed
      - .2 USG
      - .3 Other accepted equivalents
  - .2 Ceiling Type: Type XII-Glass fibre base with membrane-faced overlay
  - .3 Pattern Description: E-Lightly textured.
  - .4 Surface Burning Characteristics: To CAN/ULC-S102:
    - .1 Flame-Spread Rating: 25 or less.
  - .5 Sound Absorption Average (SAA) or Noise Reduction Coefficient (NRC): Minimum 0.90 to ASTM C423.
  - .6 Articulation Class (AC): 190 to ASTM E1111/E1111M.
  - .7 Light Reflectance (LR): 0.85 minimum, 0.90 maximum to ASTM E1477.



- .8 Panel Edge Type: Square Tegular
- .9 Colour: White.
- .10 Panel Size: 610 mm x 610 mm or 610 mm x 1220 mm, nominal, as indicated in Drawings.
- .11 Panel Thickness: As required to meet specified performance values.
- .2 Acoustical Panel AP-1A: To ASTM E1264 and as follows: Open office spaces – Alternative Price refer to Section 01 23 00.
  - .1 Basis of Design: Lyra, Armstrong World Industries, Inc.
    - .1 Other acceptable Manufacturers with equivalent systems:
      - .1 CertainTeed
      - .2 USG
      - .3 Other accepted equivalents
  - .2 Ceiling Type: Type XII-Glass fibre base with membrane-faced overlay
  - .3 Pattern Description: E-Lightly textured.
  - .4 Surface Burning Characteristics: To CAN/ULC-S102:
    - .1 Flame-Spread Rating: 25 or less.
  - .5 Sound Absorption Average (SAA) or Noise Reduction Coefficient (NRC): Minimum 0.90 to ASTM C423.
  - .6 Articulation Class (AC): 190 to ASTM E1111/E1111M.
  - .7 Light Reflectance (LR): 0.85 minimum, 0.90 maximum to ASTM E1477.
  - .8 Panel Edge Type: Square Tegular
  - .9 Colour: White.
  - .10 Panel Size: 610 mm x 610 mm or 610 mm x 1220 mm, nominal, as indicated in Drawings.
  - .11 Panel Thickness: As required to meet specified performance values.
- .3 Acoustical Panel AP-2: To ASTM E1264 and as follows: Enclosed offices spaces
  - .1 Basis of Design: Ultima, Armstrong World Industries, Inc.
    - .1 Other acceptable Manufacturers with equivalent systems:
      - .1 CertainTeed
      - .2 USG
      - .3 Other accepted equivalents
  - .2 Ceiling Type: Type IV-Mineral base with membrane-faced overlay.
  - .3 Pattern Description: E-Lightly textured.
  - .4 Surface Burning Characteristics: To CAN/ULC-S102:
    - .1 Flame-Spread Rating: 25 or less.

- .5 Sound Absorption Average (SAA) or Noise Reduction Coefficient (NRC): Minimum 0.75 to ASTM C423.
- .6 Ceiling Attenuation Class (CAC) Rating: 35, to ASTM E1414/E1414M.
- .7 Light Reflectance (LR): 0.85 minimum to 0.90 maximum to ASTM E1477.
- .8 Panel Edge Type: Square Tegular
- .9 Colour: White.
- .10 Panel Size: 610 mm x 610 mm or 610 mm x 1220 mm, nominal, as indicated in Drawings.
- .11 Panel Thickness: As required to meet specified performance values.
- .4 Acoustical Panel AP-2A: To ASTM E1264 and as follows: Enclosed offices spaces - Alternative Price refer to Section 01 23 00.
  - .1 Basis of Design: Calla, Armstrong World Industries, Inc.
    - .1 Other acceptable Manufacturers with equivalent systems:
      - .1 CertainTeed
      - .2 USG
      - .3 Other accepted equivalents
    - .2 Ceiling Type: Type IV-Mineral base with membrane-faced overlay.
    - .3 Pattern Description: E-Lightly textured.
    - .4 Surface Burning Characteristics: To CAN/ULC-S102:
      - .1 Flame-Spread Rating: 25 or less.
    - .5 Sound Absorption Average (SAA) or Noise Reduction Coefficient (NRC): Minimum 0.75 to ASTM C423.
    - .6 Ceiling Attenuation Class (CAC) Rating: 35, to ASTM E1414/E1414M.
    - .7 Light Reflectance (LR): 0.85 minimum to 0.90 maximum to ASTM E1477.
    - .8 Panel Edge Type: Square Tegular
    - .9 Colour: White.
    - .10 Panel Size: 610 mm x 610 mm or 610 mm x 1220 mm, nominal, as indicated in Drawings.
    - .11 Panel Thickness: As required to meet specified performance values.

## 2.05 ACCESSORIES

- .1 Edge Trim for Transitions:
  - .1 Provide trims and transitions from same manufacturer as other Acoustical Panel Ceiling components wherever possible.
    - .1 Manufacturers accepted based upon above options.
  - .2 Basis of Design: AXIOM Trim & Transitions, Armstrong World Industries, Inc., or approved equivalent.

- .1 AXIOM Transitions Exposed Tee 15/16" Shadow Reveal Transition Molding Straight for all locations between co-planar drywall ceilings and acoustic panel tile ceilings. Refer to Drawings.
- .2 AXIOM Transitions Acoustical-to-Drywall elevation change, 2" straight transition, for CA-2 ceiling perimeter, Room R4-10.

### **3 EXECUTION**

#### **3.01 EXAMINATION**

- .1 Verify substrate conditions are acceptable for installation of acoustical ceiling panel and suspension system in accordance with manufacturer's instructions.
  - .1 Inform responsible Subcontractor(s) and Consultant of unacceptable conditions immediately upon discovery.
  - .2 Proceed with installation after unacceptable conditions are remedied.

#### **3.02 INSTALLATION - SUSPENSION SYSTEM**

- .1 Comply with manufacturer's installation instructions and recommendations, including product technical bulletins, installation instructions, and data sheets.
- .2 Install suspension system in accordance with accepted shop drawings and ASTM C636/C636M except where specified otherwise.
- .3 Install suspension system by suspending ceiling hangers from building's structural members, and as follows:
  - .1 Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  - .2 Attach hangers to structural members or intermediate structural supports.
  - .3 Fasten hangers to cast-in-place hanger inserts, powder actuated fasteners, or drilled in anchors into concrete.
  - .4 Splay hangers only where required to miss obstructions. Offset resulting horizontal forces by bracing or counter-splaying.
- .4 Lay out centre line of ceiling both ways, to provide balanced borders at room perimeter with border units not less than 50% of standard unit width unless otherwise outlined in system according to reflected ceiling plan in Drawings.
- .5 Installation Tolerances: Finished ceiling system square with adjacent walls and level within 1:1000.
- .6 Secure hangers to overhead structure using attachment methods as indicated and acceptable to Consultant.
- .7 Install hangers spaced at a maximum 1200 mm on centre and within 150 mm from ends of main tees.
- .8 Coordinate suspension system with location of related components. Provide carrying channels as necessary to bridge at unavoidable interference between suspension system and other work above ceiling.

- .9 Install wall moulding to provide correct ceiling height.
- .10 Completed suspension system to support super-imposed loads, such as lighting fixtures, diffusers, grilles, etc.
- .11 Support light fixtures, diffusers with additional ceiling suspension hangers within 150 mm of each corner and at a maximum 610 mm around perimeter of fixture.
- .12 Interlock or attach cross member to main runner to provide rigid assembly, as required by Manufacturer.
- .13 Frame at openings for light fixtures, air diffusers, speakers, and at changes in ceiling heights.
- .14 Install access splines to provide 10% ceiling access.
- .15 Install perimeter trim to suspension system, in accurate alignment with adjacent assemblies. Install curved trim members in smooth curves to radius indicated.

### **3.03 INSTALLATION - ACOUSTICAL CEILING PANEL SYSTEM**

- .1 Install lay-in acoustical panels in ceiling suspension system in accordance with manufacturer's instructions and as indicated.
- .2 Install panels with edges fully hidden from view by flanges of suspension system runners and mouldings.

### **3.04 SITE QUALITY CONTROL**

- .1 Non-Conforming Work:
  - .1 Do not support ceilings directly from permanent metal forms, floor deck, or other non-structural framing.
  - .2 Do not attach hangers to steel roof deck or steel deck tabs.
  - .3 Do not attach hangers directly to from mechanical or electrical systems or elements.
  - .4 Do not level ceilings by putting kinks in suspension wires. Kinks in suspension wires are not acceptable.
  - .5 Conceal fasteners including pop rivets on mouldings and trims.
  - .6 Do not leave fingerprints, smudges or other marks on ceiling panels.

### **3.05 CLEANING**

- .1 Progress Cleaning: In accordance with Section 01 74 00 - Cleaning.
- .2 Final Cleaning: In accordance with Section 01 74 00 – Cleaning, and touch-up scratches, abrasions, voids, and other defects in painted surfaces.

### **3.06 PROTECTION**

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

### 3.07 SCHEDULE

- .1 Refer to Drawings for locations.
- .2 C-1:
  - .1 Suspension grid: CSS-1
  - .2 Acoustic Panel:
    - .1 Open office spaces: AP-1
    - .2 Enclosed office spaces: AP-2
- .3 C-1A: Alternative pricing in lieu of C-1 (see Section 01 23 00 Alternatives):
  - .1 Suspension grid: CSS-1A
  - .2 Acoustic Panel:
    - .1 Open office spaces: AP-1A
    - .2 Enclosed office spaces: AP-2A
- .4 CA-2
  - .1 Suspension grid: CSS-2, field paint custom colour, colour as selected by Consultant.
  - .2 Refer to Section 09 84 00 - Acoustic Room Components for tiles.
- .5 Provisional Price Perimeter Gypsum Board Ceiling
  - .1 AXIOM Transitions Exposed Tee 15/16" Shadow Reveal Transition Molding Straight for all locations between co-planar drywall ceilings and acoustic panel tile ceilings. Refer to Drawings.

**END OF SECTION**

## **1 GENERAL**

### **1.01 SUMMARY**

- .1 Section includes:
  - .1 Solid resilient tile flooring.
  - .2 Resilient base.

### **1.02 RELATED REQUIREMENTS**

- .1 Section 09 30 13 - Ceramic Tiling
- .2 Section 09 68 13 - Tile Carpeting

### **1.03 REFERENCE STANDARDS**

- .1 ASTM International (ASTM):
  - .1 ASTM E96/E96M-16, Standard Test Methods for Water Vapor Transmission of Materials
  - .2 ASTM F710-21, Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
  - .3 ASTM F1861-21, Standard Specification for Resilient Wall Base
  - .4 ASTM F1869-23, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
  - .5 ASTM F2873-20, Standard Practice for the Installation of Self-Leveling Underlayment and the Preparation of Surface to Receive Resilient Flooring
  - .6 ASTM F3010-18, Standard Practice for Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use Under Resilient Floor Coverings
  - .7 ASTM F3191-23, Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring
- .2 CSA Group (CSA):
  - .1 CSA A23.1:19/A23.2:19, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete
  - .2 CSA B651-18, Accessible Design for the Built Environment
- .3 International Concrete Repair Institute (ICRI):
  - .1 ICRI 310.2R-2013, Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair
- .4 National Floor Covering Association (NFCA):
  - .1 Floor Covering Reference Manual, current edition
- .5 ULC Standards (ULC):
  - .1 CAN/ULC S102.2:2018, Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies

#### 1.04 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
  - .1 Coordinate with Section 02 41 19 - Selective Demolition for floor substrate preparation. Demolition may include mechanical or chemical removal of existing floor coverings, adhesives, sealers, paint, curing agents, and other surface contaminants.
  - .2 Coordinate with Section 09 68 13 - Tile Carpeting for edge strip installation where resilient tile flooring is adjacent to carpet, if different in material thicknesses.
  - .3 Coordinate with Section 09 30 13 - Ceramic Tiling for installation of edge strips and transition strips adjacent to ceramic tile.
- .2 Sequencing: Install flooring after painting, ceiling work, and other overhead work are complete.

#### 1.05 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product data: Product literature and data sheets for installed products, including product characteristics, performance criteria, physical sizes, finishes, and limitations.
- .3 Shop drawings:
  - .1 Show layout, locations of seams, edges, doorways, built-in furniture, cabinets, and cut-outs.
    - .1 Locations and types of edge strips, reducer strips, and transition strips, including flooring penetrations.
- .4 Samples: To verify specified colours, patterns, textures, profiles, and finishes.
  - .1 Full size tile samples of each type of resilient tile flooring.
  - .2 100 mm long sections of resilient base, full profile height.
  - .3 100 mm long sections of each type of edge strip and transition strip.
  - .4 Provide minimum two samples for each unique type/colour. Provide one physical sample to Consultant and one to Owner for review.
- .5 Site quality control submittals:
  - .1 Submit floor pre-installation test results before beginning flooring installation. Compare tested moisture vapour emission rates and alkalinity with manufacturer's requirements for each flooring type.
  - .2 Submit manufacturer's recommended corrective actions when pre-installation test results deviate from manufacturer's installation requirements.
- .6 Manufacturer's instructions: Indicate special storage and handling requirements, installation instructions and sequence, and cleaning procedures; keep a copy on site during installation.

#### 1.06 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

- .2 Operation and maintenance data: Include, in the operation and maintenance manual, manufacturer's maintenance instructions and recommended cleaning materials and methods.
- .3 Warranty documentation: Submit manufacturer's warranties.

#### **1.07 MAINTENANCE MATERIAL SUBMITTALS**

- .1 Extra stock materials: In accordance with Section 01 78 00 - Closeout Submittals.
- .2 Supply minimum one box or 5% of each (whichever is greater) of each colour, pattern, texture, and type of resilient tile flooring material in full sizes.
  - .1 Label each box of tile flooring; match designations indicated on Drawings.
- .3 Supply minimum 5% of resilient base, in each specified colour and height.

#### **1.08 QUALITY ASSURANCE**

- .1 Manufacturer Qualifications:
  - .1 Minimum ten (10) years experience in the manufacturing of commercial resilient floor tile.
- .2 Installer Qualifications:
  - .1 Minimum three (3) years documented successful experience in the installation of commercial resilient floor tile.
  - .2 Apprentices are acceptable when under direct supervision of qualified journeyperson in accordance with applicable trade regulation.

#### **1.09 DELIVERY, STORAGE, AND HANDLING**

- .1 Perform in accordance with Section 01 61 00 - Common Product Requirements, and:
  - .1 Protect adhesives, sealers, and sealants from freezing.
  - .2 Coordinate delivery of materials with scheduled installation to allow minimum conditioning time on site.

#### **1.10 SITE CONDITIONS**

- .1 Ambient conditions: Maintain specified ambient conditions, or more stringent manufacturer requirements, for 72 hours before installation, continuously during installation, and 72 hours after installation.
  - .1 Ambient room temperature: 18°C to 29°C.
  - .2 Floor substrate temperature: Minimum 15°C.
  - .3 Relative humidity: 40% to 60%.
- .2 Extra ventilation: Provide high ventilation rate, maximizing outside air, during installation and for seven (7) days after installation. If possible, vent directly to outside. Prevent contaminated air recirculation through interior air distribution system.
  - .1 Coordinate operation of existing ventilation system with Departmental Representative Consultant.



## **1.11 WARRANTY**

- .1 Manufacturer warranty: five (5) year warranty, starting from date of Substantial Performance of the Work.

## **2 PRODUCTS**

### **2.01 REGULATORY REQUIREMENTS**

- .1 Meet requirements of CAN/ULC S102.2 for required flame-spread ratings, labelled and listed by ULC or another agency acceptable to authority having jurisdiction.

### **2.02 RESILIENT TILE FLOORING MATERIALS**

- .1 Luxury vinyl tile (LVT): Heavy Commercial luxury vinyl tile with fiberglass, squared edge, 20 mil wear layer, with exoguard+ finish, direct glue installation method
  - .1 Basis of Design: ShawContract
    - .1 Style: Crossing Paths 5.0,
    - .2 Wear layer: Suitable for commercial applications.
    - .3 Thickness: 5 mm.
    - .4 Size: 460 mm x 460 mm nominal.
    - .5 Installation Pattern: Ashlar
    - .6 Colour: Spindle, 91140
  - .2 Accepted equivalent.

### **2.03 WALL BASE**

- .1 Resilient base: To ASTM F1861, with manufacturer's pre-moulded end stops and external corners, same dye lot for entire Project.
  - .1 Type: TS - Rubber, Vulcanized Thermoset.
  - .2 Group: 1 – Solid.
  - .3 Style: B - Coved.
  - .4 Thickness: 3.2 mm.
  - .5 Height: 100 mm.
  - .6 Lengths: Manufactured in continuous rolls.
  - .7 Colour: As indicated on Drawings or as selected Consultant from manufacturer's complete range.

### **2.04 ACCESSORIES**

- .1 Primer: Where recommended by flooring manufacturer for site conditions and application.
- .2 Concrete moisture emission reducer coating: Should on-site testing indicate that water vapour emissions is a concern for the existing concrete floor slab or new repairs:

- .1 Moisture insensitive, epoxy modified, forming a permanent moisture barrier, water vapour permeability less than  $[6] \text{ ng/Pa}\cdot\text{s}\cdot\text{m}$  when tested to ASTM E96/96M (wet method). Other test methods will be considered.
- .3 Adhesives: Types recommended by flooring manufacturer for substrate; above, on, or below grade.
  - .1 Cove base adhesives: Type recommended by base manufacturer to suit application.
- .4 Sub-floor filler and leveller: As recommended by flooring manufacturer for use with their product.
- .5 Edge and transition strips: To CSA B651, CSA/ASC B651 for maximum vertical rise and slope.
  - .1 Aluminum: Designed for resilient tile to other adjacent materials as indicated on the Drawings.
    - .1 Surface texture: Smooth.
    - .2 Widths / Profile:
      - .1 As required to comply with the maximum vertical rise and slope requirements of CSA and the Ontario Building Code.
    - .3 Finish: Clear anodic coating unless otherwise selected by the Consultant from manufacturer's samples.
  - .2 Resilient rubber:
    - .1 Bevelled floor flange, width as selected from manufacturer's standard offerings, maximum width 38mm.
    - .2 Bevelled surface to finish flush with resilient tile for tight joint and other side to floor finish.
    - .3 Colour: As selected by the Consultant from manufacturer's standard offerings.
- .6 Edging to floor penetrations: Stainless steel, profile recommended by resilient tile flooring manufacturer.
- .7 Sealer: As recommended by resilient tile flooring manufacturer.

### **3 EXECUTION**

#### **3.01 EXAMINATION**

- .1 Verification of conditions: Verify conditions in accordance with Section 01 71 00 - Examination and Preparation, and:
  - .1 Concrete floors are free of cracks, ridges, and depressions.
  - .2 Substrate tolerances are within resilient tile flooring manufacturer's recommendations.
  - .3 Concrete surface profile is within resilient tile flooring manufacturer's recommendations.
  - .4 Painting and ceiling work is complete.

- .2 Pre-installation testing: Perform tests to verify concrete floors are dry, with moisture vapour emission rate and alkalinity within the manufacturer's recommendations. Perform tests to test methods in NFCA Floor Covering Reference Manual, except where resilient tile flooring manufacturer recommends more stringent test methods and requirements. Notify Consultant of testing date so they may choose to attend at their discretion.
  - .1 Perform tests before installation of subsequent products (hydraulic cement underlayment, fillers, patching materials, adhesives, etc.).
  - .2 Test substrate moisture vapour emissions to ASTM F710. Perform a minimum three (3) tests for the first 100 m<sup>2</sup> and one additional test per 100 m<sup>2</sup> of additional floor area.
  - .3 Test substrate alkalinity to ASTM F710, pH range of 7 to 9. Perform one test per 100 m<sup>2</sup> of floor area.
  - .4 Test substrate porosity using test method recommended by resilient tile flooring manufacturer.
  - .5 Perform adhesive bond test to cleaned 1.0 x 1.0 m concrete substrate in accordance with NFCA Floor Covering Reference Manual, unless otherwise recommended by floor covering manufacturer, and allow to cure for 72 hours before evaluating bond strength.

### 3.02 PREPARATION

- .1 Protection of in-place conditions: Protect face of doors, door frames, and walls from marring due to installation of resilient tile flooring.
- .2 Surface preparation: In accordance with NFCA Floor Covering Reference Manual, Part A13 and ASTM F710 for concrete floors, and ASTM F2873 and ASTM F2471, manufacturer's instructions.
  - .1 Remove or treat old adhesives to prevent residual, old flooring adhesives from bleeding through to new flooring and interfering with the bonding of new adhesives.
  - .2 Remove pen and marker lines completely from concrete surfaces.
  - .3 If concrete floor substrate vapour emissions exceed manufacturer's recommendations, prepare substrate in accordance with ASTM F3010.
  - .4 Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with subfloor filler.
  - .5 Where floor substrate flatness and levelness tolerances do not meet minimum requirements to begin installation of resilient tile flooring, prepare substrate in accordance with NFCA Floor Covering Reference Manual.
  - .6 Clean floor of dust, mould, mildew, alkaline salts, laitance, concrete film-forming curing compounds, paint, solvents, wax, oil, grease, residual adhesive, adhesive removing compounds, sealants, soap, and other foreign material.
  - .7 Fill low spots, cracks, joints, holes and other defects with subfloor filler in accordance with ASTM F2873 or ASTM F2471, as recommended by manufacturer. Trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler is cured.
  - .8 Prime or Seal concrete slab to resilient tile flooring and adhesive manufacturer's recommendations.

- .9 Vacuum substrates.
- .10 Do not use permanent markers on floor substrates.

### **3.03 INSTALLATION – RESILIENT TILE**

- .1 Install resilient tile flooring and accessories using tools, materials, methods, and sequence of work to NFCA Floor Covering Reference Manual recommendations and manufacturer's recommendations.
- .2 Mix and apply adhesive uniformly in accordance with manufacturer's instructions, using manufacturer-recommended trowel notching, spread, coverage rate, open times, and safety precautions. Do not spread more adhesive than can be covered by flooring before initial set. Applying adhesive only at perimeter is not acceptable.
- .3 Lay flooring with joints parallel to building lines to produce symmetrical tile pattern unless otherwise requested by Consultant. Border tiles minimum half tile width, but not less than 150 mm wide.
- .4 Install flooring to patterns indicated on Drawings or indicated in Submittals by Consultant from Manufacturer's recommended installation types.
- .5 Cut resilient tile and fit neatly around fixed objects.
- .6 Cut resilient tile to fit tightly in pan type floor access covers and to frames, using hardware cut-outs.
- .7 Install resilient tile flooring in areas which will be under built-in furniture.
- .8 Install resilient tile flooring through areas to receive movable type partitions without interrupting floor pattern.
- .9 Install resilient tile flooring through doorways and scribed to fit projections and vertical surfaces.
- .10 Terminate flooring under centreline of door, in openings where adjacent floor finish material or colour are dissimilar.
- .11 During and after installation, roll flooring in two directions with minimum weighted roller to achieve full adhesion and prevent visible adhesive or trowel marks, unless otherwise indicated by flooring manufacturer.
- .12 Install edge strips at floor penetrations, and edge strips at unprotected and exposed edges where flooring terminates to suit conditions. Securely bond to substrate and in a straight line.

### **3.04 INSTALLATION – WALL BASE**

- .1 Lay out resilient base with minimum number of joints.
- .2 Clean substrate and prime with one coat of adhesive.
- .3 Set resilient base against wall and floor surfaces tightly by using 3-kg hand roller.
- .4 Install straight and level to variation of 1:1000.
- .5 Scribe, cut, and fit wall base to door frames and other obstructions. Install pre-moulded end pieces at flush door frames.
- .6 Install pre-moulded wall base corner units for right angle external and internal corners. Install formed straight wall base for non-90 degree corners.

**3.05 APPLICATION - FINISHES**

- .1 Seal and wax floors to resilient tile flooring manufacturer's instructions.

**3.06 ADJUSTING**

- .1 Repair or replace deficient work in accordance with NFCA and Manufacturer requirements.

**3.07 CLEANING**

- .1 Cleaning: Perform in accordance with Section 01 74 00 - Cleaning.
  - .1 Remove excess adhesive before cured.
- .2 Replace resilient tiles that cannot be cleaned to the acceptance of the Consultant.

**3.08 CLOSEOUT ACTIVITIES**

- .1 Demonstration and training: Perform in accordance with Section 01 79 00 - Demonstration and Training.
  - .1 Recommend cleaning and finishing products to suit site conditions and application and that will not affect flooring slip-resistance.
  - .2 Demonstrate periodic cleaning methods for each resilient flooring type.

**3.09 PROTECTION**

- .1 Protect flooring with non-marring temporary coverings until Substantial Performance.
- .2 Prohibit traffic on resilient tile flooring for a minimum 48 hours after installation, or as recommended by Manufacturer, whichever is longer.
- .3 Protect resilient tile flooring from heavy rolling loads during construction with plywood, hardboard, or other protection method recommended by resilient tile flooring manufacturer.
- .4 Allow a minimum 24 hours for site-applied finishes to dry before permitting foot traffic and a minimum seven (7) days before placing furniture and similar heavy objects.

**3.10 SCHEDULE**

- .1 Refer to finishes in Drawings.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 09 65 19 - Resilient Tile Flooring

### **1.02 DEFINITIONS**

- .1 N/A

### **1.03 REFERENCE STANDARDS**

- .1 Canadian General Standards Board (CGSB):
  - .1 CAN/CGSB-4.2, Textile Test Methods
  - .2 CAN/CGSB-4.129-93, Carpet for Commercial Use
  - .3 CAN/CGSB-25.20, Surface Sealer Floors
- .2 Carpet and Rug Institute (CRI):
  - .1 CRI 104-2015, Standard for Installation of Commercial Carpet
  - .2 CRI 204-2019, Commercial Carpet Standard for Maintenance and Cleaning
  - .3 CRI IAQ Carpet Testing Program
- .3 International Organization for Standardization (ISO):
  - .1 ISO 2551:2020, Textile floor coverings and textile floor coverings in tile form — Determination of dimensional changes due to the effects of varied water and heat conditions and distortion out of plane
- .4 ULC Standards (ULC):
  - .1 CAN/ULC-S102.2:2018, Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies

### **1.04 ADMINISTRATIVE REQUIREMENTS**

- .1 Sequencing:
  - .1 Install tile carpeting after:
    - .1 wet-work in areas is complete and dry
    - .2 work above ceilings is complete
    - .3 ceiling work is complete
  - .2 Install tile carpeting before:
    - .1 demountable office partitions are installed
    - .2 electrical and communications pedestals are installed

### **1.05 ACTION AND INFORMATIONAL SUBMITTALS**

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

- .2 Product data: Product literature and data sheets, including product characteristics, performance criteria, physical sizes, colours and patterns, example warranty documentation.
  - .1 Submit product data for:
    - .1 each type of carpet tile
      - .1 Indicate locations by room number and/or marked up plan drawing, installation pattern (monolithic, ashlar, quarter turn, etc.), direction of carpet pile / pattern
    - .2 subfloor patching compounds
    - .3 water vapour emission sealers
    - .4 primers
    - .5 adhesives
    - .6 edge and transition strips
      - .1 Indicate locations by room number and/or marked up plan drawing
    - .7 resilient wall base
  - .2 Submit WHMIS SDSs for:
    - .1 primers
    - .2 adhesives
    - .3 water vapour emission sealers
- .3 Samples:
  - .1 Manufacturer's full size samples to verify specified / selected colours, patterns, textures, and finishes.
    - .1 Submit samples for:
      - .1 carpet tiles, each type, pattern, and colour specified
      - .2 edge and transition strips
      - .3 resilient wall base
    - .2 Provide minimum two (2) samples for each unique type/colour of Carpet. Provide one physical sample to Consultant and one to Owner for review.
      - .1 Samples shall be mailed or hand delivered to both Consultant and Owner unless arrangement for pick-up specifically coordinated with a on-site meeting. Hand over at an on-site meeting is only an acceptable option if it does not cause delay in project schedule.
    - .3 Samples will not be returned.
- .4 Test and evaluation reports:
  - .1 Indicating carpet tile flame-spread rating and smoke developed classification acceptable to the authority having jurisdiction, and in accordance with what is specified below in this section.

- .2 Indicating proof of carpet being tested and passing of the Indoor Air Quality (IAQ) Carpet Testing Program requirements of the Carpet and Rug Institute.
- .5 Manufacturer's instructions:
  - .1 Special delivery, storage, and handling requirements.
  - .2 Installation instructions.
  - .3 Recommended sequencing.
  - .4 Cleaning procedures.
  - .5 Keep a copy on site during installation.
- .6 Site quality control submittals: Indicating results of pre-installation testing specified below in this section. Describe locations of each test.

#### **1.06 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and maintenance data:
  - .1 Include, in the operation and maintenance manual, manufacturer's maintenance instructions and recommended cleaning materials and methods.
  - .2 Include information on future recycling of tile carpeting, such as manufacturer's reprocessing program.
- .3 Warranty documentation: Submit manufacturer's material warranty.

#### **1.07 MAINTENANCE MATERIAL SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Extra stock materials:
  - .1 Supply extra materials from the same production run as installed products. Package extra materials with protective covering and identify with labels.
  - .2 Supply minimum:
    - .1 5% of installed area of each type of carpet, with minimum one (1) box.
    - .2 5% of each type of edge and transition strips, minimum three (3) m lengths.



## 1.08 QUALITY ASSURANCE

- .1 Qualifications:
  - .1 Manufacturer: Minimum ten (10) years experience in the manufacturing of commercial carpet tile.
  - .2 Installer:
    - .1 Minimum three (3) years documented successful experience in the installation of commercial carpet tile.
    - .2 Apprentices are acceptable when under direct supervision of qualified journeyman in accordance with applicable trade regulation.

## 1.09 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements, and:
  - .1 Store carpet and adhesive at a minimum 18 °C and relative humidity of a maximum 65%, for a minimum 48 hours before installation.

## 1.10 SITE CONDITIONS

- .1 Ambient conditions:
  - .1 Substrate: Moisture emission limits and alkalinity limits as recommended by the carpeting manufacturer.
  - .2 Temperature: Maintain minimum 18 °C ambient temperature for minimum 48 hours before, during, and minimum 48 hours after installation.
  - .3 Relative humidity: Maintain between 10% and 65% for minimum 48 hours before, during, and minimum 48 hours after installation.
- .2 Ventilation:
  - .1 Ventilate installation areas in accordance with Section 01 51 00 - Temporary Utilities. Use approved portable supply and exhaust fans.
  - .2 Run ventilation continuously for minimum 24 hours before, during, and minimum seven (7) days after installation.

## 1.11 WARRANTY

- .1 Manufacturer warranty: Manufacturer's standard warranty document, executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights the Owner may have under the Contract.
  - .1 Manufacturer's warranty period: 10 years minimum, starting from date of Substantial Performance of the Work.
  - .2 Warranty coverage:
    - .1 Excessive surface wear: More than 15% loss of pile fibre weight.
    - .2 Resiliency: More than 10% loss of backing.
    - .3 Delamination of backing.
    - .4 Edge ravel.

- .5 Zippering.
- .6 Exclusions: Where caster wheeled chairs are located directly over seams without chair protectors.
- .2 Installation Warranty:
  - .1 Provide a written guarantee stating that carpet installation is guaranteed against defects for two (2) years from Date of Substantial Performance.

## 2 PRODUCTS

### 2.01 TILE CARPETING

- .1 Basis of Design (CAR-1):
  - .1 Type: Multi-level pattern loop carpet tile with ecoworx backing, ecosolution Q100 Nylon fibre, 100% solution dyed.
    - .1 Manufacturer: Shaw Contract
    - .2 Style: Weft Tile, 5T654
    - .3 Colour: Rovina, 48510
    - .4 Tile size: 230 mm x 910 mm.
    - .5 Installation Pattern: Stagger.
    - .6 Provide each carpet type from same dye lot.
  - .2 Accepted equivalent.
- .2 Regulatory requirements:
  - .1 Comply with HC SOR/2016 176.
  - .2 Surface burning characteristics: To CAN/ULC S102.2.

### 2.02 ACCESSORIES

- .1 Subfloor patching compound: Smooth trowelling, fast setting, non-shrinking, pre-mixed filler with Portland cement and polymeric modifiers, suitable for substrate conditions, and in accordance with manufacturer's instructions.
  - .1 28-day compressive strength: Minimum 20 MPa.
  - .2 Basis of design: "Planipatch", by Mapei or approved equivalent.
- .2 Water vapour emission sealer: Liquid-applied, should on-site testing indicate that water vapour emissions is a concern for the existing concrete floor slab or new repairs.
  - .1 Reduces water vapour emissions through concrete slab and/or subfloor patching compound to acceptable levels and provides a permanent barrier between concrete alkalinity and carpeting.
  - .2 VOC and other chemical limits for on-site, wet-applied products: To ECCC SOR/2009-264.
  - .3 Basis of design: "Planiseal MRB", by Mapei or approved equivalent.

- .3 Primer: When recommended for site conditions, type in accordance with manufacturer's instructions for surface conditions.
  - .1 VOC and other chemical limits for on-site, wet-applied products: To ECCC SOR/2009-264.
- .4 Adhesives: Water-resistant type recommended by carpet and adhesive manufacturers for site conditions and application, compatible with carpet tile backing, and low VOC content in accordance with CRI requirements.
  - .1 Types:
    - .1 Pressure sensitive: For releasable carpet installation.
    - .2 Multi-purpose.
- .5 Edge and transition strips: To CSA B651, CSA/ASC B651 for maximum vertical rise and slope.
  - .1 Aluminum: Designed for carpet tile to other adjacent materials as indicated on the Drawings.
    - .1 Surface texture: Smooth.
    - .2 Widths / Profile:
      - .1 As required to comply with the maximum vertical rise and slope requirements of CSA and the Ontario Building Code.
    - .3 Finish: Clear anodic coating unless otherwise selected by the Consultant from manufacturer's samples.
  - .2 Resilient rubber:
    - .1 Bevelled floor flange, width as selected from manufacturer's standard offerings, maximum width 38mm.
    - .2 Bevelled surface to finish flush with carpet tile for tight joint and other side to floor finish.
    - .3 Colour: As selected by the Consultant from manufacturer's standard offerings.
- .6 Resilient wall base: In accordance with Section 09 65 19 - Resilient Tile Flooring.
- .7 Carpet Protection: Non-staining heavy-duty kraft paper, or cardboard.

### **3 EXECUTION**

#### **3.01 EXAMINATION**

- .1 Verification of conditions:
  - .1 Verify substrate and project conditions in accordance with Section 01 71 00 - Examination and Preparation, and:
    - .1 Verify conditions comply with manufacturer's recommendations and CRI 104.
    - .2 Verify concrete substrates are cured, clean, and dry.
    - .3 Verify concrete substrates are free of paint, dirt, grease, oil, curing or parting agents, and other contaminants, including sealers, that could interfere with the bonding of adhesive.

- .2 Pre-installation testing:
  - .1 Concrete slab testing: Perform two tests per 20 m<sup>2</sup> of floor area to determine special care required to make it suitable for carpet installation.
    - .1 Moisture vapour emission rate: To ASTM F1869.
    - .2 Relative humidity: To ASTM F2170.
    - .3 Alkalinity: To ASTM F710.

### 3.02 PREPARATION

- .1 Surface preparation:
  - .1 Prepare surfaces in accordance with Section 01 71 00 - Examination and Preparation, and:
    - .1 Comply with CRI 104.
    - .2 Fill and level cracks 3 mm wide and protrusions over 0.8 mm with appropriate and compatible subfloor patching compound.
    - .3 Apply sub-floor filler/patch to low spots to achieve floor level to a tolerance of 1:500. Allow to cure.
    - .4 Comply with manufacturer's instructions for maximum patch thickness.
    - .5 Prime large patch areas with compatible primer.
    - .6 Apply water vapour emission sealer if pre-installation tests indicate moisture emission rate or alkalinity exceed carpet tile recommendations.
- .2 Pre-condition tile carpeting for minimum 48 hours in accordance with manufacturer's recommendations.

### 3.03 INSTALLATION

- .1 Install tile carpeting in accordance with manufacturer's instructions, reviewed submittals and CRI 104.
- .2 Install carpet tiles from same dye lot within each room/visual area.
- .3 Installation pattern: As indicated on Drawings, or as selected by Consultant from manufacturer's recommendations in submittal review.
- .4 Install tile carpeting with tight joints.
  - .1 Measure distance covered by eleven carpet tiles ten joints and confirm distance is within manufacturer's recommendations.
- .5 Apply thin film of pressure-sensitive or multi-purpose adhesive, as recommended by manufacturer for substrate type, in accordance with manufacturer's instructions.
- .6 Fit tightly to architectural, mechanical, electrical, and communications features, furniture, and fitments.
- .7 Fit tightly to room perimeters, into recesses, and around projections.
- .8 Install tile carpeting into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- .9 Install tile carpeting in pan type floor access covers.

- .10 Terminate flooring under centreline of door, in openings where adjacent floor finish material or colour are dissimilar.
- .11 Install tile carpeting with continuous, level surface without bubbles, puckers, gaps, conspicuous seams, burring, or other deficiencies.
- .12 Install edge strips at exposed carpet tile edges.
- .13 Install transition strips where tile carpeting is adjacent to other flooring materials, at locations indicated in Drawings or as otherwise recommended by manufacturer and/or installer to protect edge of tile carpeting or adjacent flooring material type.

### **3.04 WALL BASE INSTALLATION**

- .1 Resilient base: In accordance with Section 09 65 19 - Resilient Tile Flooring.

### **3.05 SITE QUALITY CONTROL**

- .1 Non-conforming work: Trapped yarn between carpet tiles and glue residue on the face of carpet tiles are not acceptable.

### **3.06 CLEANING**

- .1 Clean in accordance with Section 01 74 00 - Cleaning, and:
  - .1 Clean excess adhesive off tile carpeting promptly after installation using methods and materials recommended by carpet tile and adhesive manufacturers.
  - .2 Vacuum carpets immediately after completion of installation in accordance with CRI 204.
  - .3 Replace carpet tiles that cannot be cleaned to the acceptance of the Consultant.

### **3.07 PROTECTION**

- .1 Protect partially installed and completed work from damage:
  - .1 Prohibit traffic on installed carpet for minimum 24 hours or longer if recommended by carpet manufacturer, and until adhesive is completely cured.
  - .2 Temporarily protect carpet with non-staining heavy duty kraft paper, unless otherwise recommended differently by manufacturer.

### **3.08 SCHEDULES**

- .1 Refer to finishes in Drawings.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 09 51 13 – Acoustical Panel Ceilings

### **1.02 REFERENCE STANDARDS**

- .1 ASTM International (ASTM):
  - .1 ASTM A641/A641M-19, Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
  - .2 ASTM C423-17, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
  - .3 ASTM E795-16, Standard Practices for Mounting Test Specimens During Sound Absorption Tests
- .2 ULC Standards (ULC):
  - .1 CAN/ULC-S102-10, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies

### **1.03 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination:
  - .1 Coordinate installation of acoustical ceiling panels with other work penetrating ceilings including Diffusers, Registers, Grilles, Fire Suppression and Lighting.
  - .2 Coordinate installation of hanging acoustical ceiling units with Sprinkler Systems to avoid affecting sprinkler head water distribution pattern.
- .2 Sequencing: Begin work of this Section after work of Section 09 91 23 - Interior Painting is complete and dry.

### **1.04 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: Submit product data for each acoustic product and each type of mounting hardware. Describe components, and list noise reduction coefficient (NRC) value(s), flame spread rating(s), smoke developed classification(s) and required clearances.
- .3 Shop Drawings:
  - .1 Submit shop drawings indicating elevation of each interior wall and interior ceiling with dimensioned acoustic room components. Locate acoustic products with dimensions to nearby walls, door and window frames. Include details of penetrations through acoustic panels/units.
- .4 Samples for Initial Selection: Submit 150-mm x 150-mm samples of acoustic room components illustrating complete range of colours and patterns for Consultant's selection.
  - .1 Provide two (2) complete sets of samples. Deliver one (1) set to Owner and one (1) to Consultant.

- .5 Samples for Verification: Submit duplicate 200-mm x 300-mm nominal samples of each type of acoustic room component illustrating finish, dimensions, and edge condition.
  - .1 Provide two (2) complete sets of samples. Deliver one (1) set to Owner and one (1) to Consultant.
- .6 Test and Evaluation Reports: When requested by Consultant, submit certified test reports from recognized test laboratories substantiating product performance values.
- .7 Qualification Statements: Submit installer's qualifications and project references, when requested by Consultant in accordance with Section 01 43 00 – Quality Assurance.

#### **1.05 CLOSEOUT SUBMITTALS**

- .1 Operation and Maintenance Data: Submit manufacturer's recommendations for cleaning acoustic room components. Include recommended cleaning products and procedures, and warnings of products that could cause damage to finishes.
- .2 Warranty Documentation: Submit manufacturer's warranty for each type of acoustic room component.

#### **1.06 MAINTENANCE MATERIAL SUBMITTALS**

- .1 Extra Stock Materials:
  - .1 Supply extra materials of each acoustic room component type in accordance with Section 01 78 00 - Closeout Submittals.
  - .2 Supply a sufficient amount of acoustic room components for maintenance use amounting to 10% of installed work for each colour, pattern, size, and type required for the Project.

#### **1.07 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Manufacturer: Provide all acoustic panel products of the same type from a single manufacturer.
  - .2 Installer: Three (3) years of successful experience installing acoustic units of similar scope to this Project.

#### **1.08 DELIVERY, STORAGE, AND HANDLING**

- .1 Perform in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Handle acoustic units wearing clean non-marking gloves. Avoid damaging corners, chipping edges, or scratching visible surfaces.
- .3 Store acoustic units in manufacturer's original packaging with labels, and in a dry indoor location, away from direct sunlight. Store units in a way that prevents sagging and other deformation.

#### **1.09 SITE CONDITIONS**

- .1 Begin installation after building is enclosed and dust generating activities are completed.
- .2 Allow wet work to dry before beginning installation.

- .3 Maintain a uniform minimum temperature of 5°C and relative humidity of 25-85% for at least 72 hours before, during, and until adhesives have cured.

## **1.10 WARRANTY**

- .1 Manufacturer's Warranty: two (2) years minimum for defects in materials and manufacturing from date of Substantial Performance.

## **2 PRODUCTS**

### **2.01 REGULATORY REQUIREMENTS**

- .1 Acoustic room components to comply with the following fire hazard classifications to CAN/ULC-S102:
  - .1 Flame Spread Rating: Class A

### **2.02 FIXED SOUND-ABSORPTIVE PANELS**

- .1 Manufacturer: As listed in SCHEDULE below in this Section or accepted equivalent.
- .2 Polyethylene Terephthalate (PET) felt Acoustic Wall Panels: Minimum 50% recycled content.
- .3 System NRC to ASTM C423: 0.55 minimum.
- .4 Panel Size: 600 mm x 600mm minimal size up to 1200 mm x 3050 mm maximum size, nominal.
- .5 Panel Thickness: 12 mm minimum, as required to meet the specified NRC value.
- .6 Edge Profile: Square or Bevel-butt, as selected by Consultant.
- .7 Surface Texture: Smooth, consistent on all panels, with etched bevel pattern.
- .8 Panel Face Surface Colour: colour as selected from manufacturer's complete colour range by Consultant.
- .9 Mounting Type: Construction Adhesive or Z-clip or mounting clip, as recommended by Manufacturer.
- .10 Accessories:
  - .1 Strip for flat-fill as needed to fit wall-to-wall and around horizontal cutouts.

### **2.03 SOUND-ABSORBING CEILING UNITS**

- .1 Manufacturer: As listed in SCHEDULE below in this Section or accepted equivalent.
- .2 Acoustically absorbing ceiling hung PET baffles and acoustic ceiling tile t-bar grid suspended PET tiles.
- .3 Noise Reduction Coefficient (NRC): 0.85 in accordance with ASTM C423.
- .4 Unit Size: Varies, refer to Schedule below for additional details.
- .5 Unit Thickness: Varies, refer to Schedule.
- .6 Ceiling Unit Finish: Smooth, consistent on all panels.
- .7 Mounting Type: Varies, refer to Schedule.



## **2.04 FABRICATION**

- .1 Conceal fastenings.
- .2 Fabricate each acoustic unit and panel complete, and ready for site installation.
- .3 Label unique acoustic units and panels with room number and other identifying information on back of component.

## **2.05 SOURCE QUALITY CONTROL**

- .1 Non-Conforming Work: Units with gouges, stains or uneven appearance will not be accepted.

## **3 EXECUTION**

### **3.01 EXAMINATION**

- .1 Verify substrates are flat to tolerance of plus or minus 3 mm over 3000 mm.
- .2 Verify substrates are clean, dry, and with blocking located within ceilings correctly.
- .3 Verify building envelope is complete and HVAC system is operational.

### **3.02 PREPARATION**

- .1 Allow products to acclimatize to room temperature and humidity for a period recommended by manufacturer, minimum 24 hours.

### **3.03 INSTALLATION - GENERAL**

- .1 Install acoustic room components plumb, level, and aligned.
- .2 Arrange acoustic room components as indicated on Drawings or selected by Consultant.
- .3 Where substrates have minor flatness irregularities, provide metal shims as required for smooth and continuous finished appearance.
- .4 Neatly cut acoustic room components to accurately fit penetrating mechanical and electrical devices, lighting and sprinkler heads with gaps concealed behind device trim.
  - .1 Leave 12 mm gap surrounding sprinkler heads unless otherwise required by Sprinkler Engineer.

### **3.04 INSTALLATION – FIXED SOUND-ABSORPTIVE PANELS**

- .1 Install panels directly to wall substrates.
- .2 Attach panels directly to finished and painted gypsum board substrate.
- .3 Butt panel joints without gaps.
- .4 Scribe acoustic panels to neatly fit adjacent work.

### **3.05 INSTALLATION – SOUND-ABSORBING CEILING UNITS**

- .1 Install ceiling units by attaching wires to building's structural members or intermediate supports or placing within acoustic ceiling tile t-bar grid support structure, as required for each unique ceiling unit, refer to Schedule.
- .2 Splay wires only where required to miss obstructions.

- .3 Install wires for ceiling units plumb and free from contact with objects in ceiling plenum that are not part of supporting structure.
- .4 Install trapezes or similar devices where width of ducts and other construction within ceiling plenum interfere with ideal wire locations.

### 3.06 SITE QUALITY CONTROL

- .1 Non-Conforming Work:
  - .1 Electrical and mechanical fixtures and devices supported by acoustic room components are not acceptable unless otherwise indicated in writing by Consultant.

### 3.07 CLEANING

- .1 Perform cleaning in accordance with Section 01 74 00 - Cleaning.
  - .1 Keep acoustic room components clean.

### 3.08 PROTECTION

- .1 When subsequent dust generating construction activities are unavoidable, protect acoustical room components with non-marring sheeting, type recommended by manufacturer.
- .2 Remove temporary protection shortly before Substantial Performance.

### 3.09 SCHEDULES

- .1 Fixed Sound-Absorptive Panels (Wall-mounted Acoustic Panels)
  - .1 Consultant reserves the right to change the basis of design colours and patterns to any other options from the manufacturer up until the completion of the submittal review process at no additional cost to the Owner. Should the amount of wall coverage change, cost will be adjusted via Change Order, in accordance with the CCDC 2 – 2020 Stipulated Price Contract.
  - .2 Rooms R4-05, R4-06, R4-11, R4-12, R4-13, R4-14, R4-15: 1200 mm x length of wall, Refer to Drawings.
    - .1 Basis of Design: Hush Acoustics
      - .1 Colour(s): Luxe Seaglass, Luxe Indigo, and Element Mocha
      - .2 Pattern: Etch 3 Stripe and Etch 9 Full Stripe
  - .3 Rooms R4-17, R4-18, R4-19, R4-20: 1200 mm x length of wall, Refer to Drawings.
    - .1 Basis of Design: Turf, Carved Wall Tile
      - .1 Colour(s): Primary, Secondary & Tertiary, as selected by Owner and Consultant
      - .2 Pattern: Tangram
  - .4 Rooms R4-03 (on TV walls of booth alcoves), R4-07, R4-08, R4-09: Floor or top of millwork to ceiling x wall to wall, Refer to Drawings.
    - .1 Basis of Design: Turf, Wall Scape Wave
      - .1 Colour(s): 28 Indigo (primary), 66 Pewter (secondary)

- .2 Pattern: Wall Scape Wave, Vertical layout
- .5 Rooms R4-03 (above linear bench)
  - .1 Basis of Design: Turf, Wall Scape Scanlines
    - .1 Colour(s): Primary & Secondary, as selected by Owner and Consultant
    - .2 Pattern: Wall Scape Scanlines, image as selected by Owner.
  - .6 Rooms R4-04, R4-10 (back wall of desk alcoves), R4-10 (west wall): As indicated in room elevations, wall to wall, floor to ceiling, Refer to Drawings.
    - .1 Basis of Design: Turf
      - .1 Colour(s): As selected by Owner and Consultant
      - .2 Pattern: Wall Panel Reed
      - .3 Include strip for flat-fill as needed to fit wall-to-wall and around horizontal cutouts that must line up with the edge of a reed flute.
- .7 Rooms R4-03:
- .2 Sound-Absorbing Ceiling Units
  - .1 Consultant reserves the right to change the basis of design colours to any other option from the manufacturer up until the completion of the submittal review process at no additional cost to the Owner. Should the amount of coverage change, cost will be adjusted via Change Order, in accordance with CCDC 2 – 2020 Stipulated Price Contract.
  - .2 CA-1: Room R4-04
    - .1 Basis of Design: Hush Acoustics, Fins
      - .1 Colour(s): Element Slate
      - .2 Unit Size:
        - .1 2700 mm (L) x 200 mm (D) fin
        - .2 Equally space fins at 170 mm on centre.
        - .3 Refer to Drawings for size of suspension area.
      - .3 Unit Thickness: 12 mm
      - .4 Mounting Type: Group suspension by T-grid structure and Galvanized steel wire to ASTM A641/A641M suspension.
  - .3 CA-2: Room R4-10
    - .1 Basis of Design: Hush Acoustics, Box Open
      - .1 Colour(s): Element Slate
      - .2 Unit Size: 605 mm x 605 mm x 140 mm
      - .3 Unit Thickness: 12 mm
      - .4 Mounting Type: Acoustic ceiling grid t-bar. Refer to Section 09 51 13 – Acoustical Panel Ceilings.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 N/A

### **1.02 REFERENCE STANDARDS**

- .1 Environmental Protection Agency (EPA)
  - .1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, EPA Method 24 - Surface Coatings.
  - .2 SW-846, Test Methods for Evaluating Solid Waste: Physical/Chemical Methods.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Safety Data Sheets (SDS).
- .3 Master Painters Institute (MPI)
  - .1 The Master Painters Institute (MPI)/Architectural Painting Specification Manual (ASM)-current edition.
- .4 National Research Council Canada (NRC)
  - .1 National Fire Code of Canada 2015 (NFC).
- .5 Society for Protective Coatings (SSPC)
  - .1 SSPC Painting Manual, Volume Two, 8th Edition, Systems and Specifications Manual.

### **1.03 ADMINISTRATIVE REQUIREMENTS**

- .1 N/A

### **1.04 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Provide manufacturer's instructions, printed product literature and data sheets for paint and paint products and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit one (1) digital copy of WHMIS SDS in accordance with Section 01 35 29 - Health, Safety, and Emergency Response Procedures.
  - .3 Confirm products to be used are in MPI's approved product list or otherwise meet the required performance specifications for this product and all performance requirements outlined in the MPI manual, if not on the MPI approved product list
- .3 Upon completion, provide records of products used. List products in relation to finish system and include the following:
  - .1 Product name, type and use.
  - .2 Manufacturer's product number.

- .3 Colour number(s).
- .4 MPI Environmentally Friendly classification system rating.
- .5 Manufacturer's Safety Data Sheets (SDS).
- .4 Samples:
  - .1 Submit three (3) 200 x 300 mm sample panels of each paint and special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards submitted:
    - .1 Manufacturer's standard paint draw down.
  - .2 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
- .5 Manufacturer's Instructions:
  - .1 Provide manufacturer's installation and application instructions.

#### **1.05 CLOSEOUT SUBMITTALS**

- .1 Provide in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: Provide operation and maintenance data for painting materials for incorporation into manual.
- .3 Include:
  - .1 Product name, type and use.
  - .2 Manufacturer's product number.
  - .3 Colour number(s).
  - .4 MPI Environmentally Friendly classification system rating or non-MPI equivalent.

#### **1.06 MAINTENANCE MATERIAL SUBMITTALS**

- .1 Extra Stock Materials:
  - .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
  - .2 Submit one (1) 4 litre can of each type and colour of primer, finish coating. Identify colour and paint type in relation to established colour schedule and finish system.

#### **1.07 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Contractor: to have a minimum of five (5) years proven satisfactory experience. When requested, provide list of last three (3) comparable jobs including, job name and location, specifying authority, and project manager.
  - .2 Qualified journeypersons as defined by local jurisdiction to be engaged in painting work.
  - .3 Apprentices: may be employed provided they work under direct supervision of qualified journeyperson in accordance with trade regulations.

- .4 Conform to latest MPI requirements for interior painting work including preparation and priming.
- .5 Materials from a single manufacturer for each system used.
- .6 Standard of Acceptance:
  - .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
  - .2 Soffits: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.
  - .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

#### **1.08 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
  - .1 Labels: to indicate:
    - .1 Type of paint or coating.
    - .2 Compliance with applicable standard.
    - .3 Colour number in accordance with established colour schedule.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Observe manufacturer's recommendations for storage and handling.
  - .3 Store materials and supplies away from heat generating devices.
  - .4 Store materials and equipment in well ventilated area with temperature range 7 degrees C to 30 degrees C.
  - .5 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Owner's representative and Consultant. After completion of operations, return areas to clean condition to approval Owner's representative and Consultant.
  - .6 Remove paint materials from storage only in quantities required for same day use.
  - .7 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
  - .8 Fire Safety Requirements:
    - .1 Provide one (1) 9 kg Type ABC or dry chemical fire extinguisher adjacent to storage area, as recommended based upon types of materials in storage area.
    - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

- .3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada (NFC).

## 1.09 SITE CONDITIONS

### .1 Ambient Conditions:

#### .1 Heating, Ventilation and Lighting:

- .1 Provide ventilation and heating facilities to maintain ambient air and substrate temperatures above 10 degrees C for 24 hours before, during and after paint application until paint has cured sufficiently.
- .2 Coordinate use of existing ventilation system with Owner's representative and Consultant and ensure its operation during and after application of paint as required.
- .3 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
- .4 Provide minimum lighting level of 323 Lux on surfaces to be painted.
- .5 Temperature, Humidity and Substrate Moisture Content Levels:

- .1 Unless pre-approved written approval by Specifying body, Paint Inspection Agency Authority and product manufacturer, perform no painting when:

- .1 Ambient air and substrate temperatures are below 10 degrees C.
- .2 Substrate temperature is above 32 degrees C unless paint is specifically formulated for application at high temperatures.
- .3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.
- .4 The relative humidity is under 85% or when the dew point is more than 3 degrees Celsius variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3 degrees C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.
- .5 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.

- .2 Perform painting work when maximum moisture content of the substrate is below:

- .1 12% for concrete and masonry (clay and concrete brick/block). Allow new concrete and masonry to cure minimum of 28 days.
- .2 12% for plaster and gypsum board.

- .3 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using "cover patch test".

- .4 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .6 Surface and Environmental Conditions:
  - .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
  - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.
  - .3 Apply paint when previous coat of paint is dry or adequately cured.
- .7 Additional interior application requirements:
  - .1 Apply paint finishes when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.

## **2 PRODUCTS**

### **2.01 PERFORMANCE REQUIREMENTS**

- .1 Environmental Performance Requirements:
  - .1 Provide paint products meeting MPI "Environmentally Friendly" E2 or E3 ratings based on VOC (EPA Method 24) content levels, unless otherwise accepted by Consultant.

### **2.02 MATERIALS**

- .1 Provide paint materials for paint systems from single manufacturer.
- .2 Only qualified products with E2 or E3 "Environmentally Friendly" rating based on VOC (EPA Method 24) content levels are acceptable for use on this project.
- .3 Conform to latest MPI requirements for interior painting work including preparation and priming.
- .4 Use MPI listed materials having minimum E2 or E3 rating where indoor air quality (odour) requirements exist.

### **2.03 COLOURS**

- .1 Owner's representative and Consultant will provide Colour Schedule after Contract award.
- .2 Colour schedule will be based upon selection of two (2) base wall colours, two (2) base ceiling colours, one (1) doors and door frames colour, and up to three (3) accent wall colours. No more than eight (8) colours will be selected for entire project.
- .3 In general, the following will be painted colour, and sheen to match adjacent surfaces:
  - .1 Access doors
  - .2 Exposed piping, conduit and ductwork.
- .4 Selection of colours will be from manufacturers full range of colours.
- .5 Where specific products are available in restricted range of colours, selection based on limited range.



- .6 For deep and ultra deep colours; four (4) coats may be required.

#### 2.04 MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to site.
- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.
- .4 Thin paint for spraying in accordance with paint manufacturer's instructions.
- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity. Strain as necessary.

#### 2.05 GLOSS/SHEEN RATINGS

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

	Gloss @ 60 degrees	Sheen @ 85 degrees
Gloss Level 1 - Matte Finish (flat)	Max. 5	Max. 10
Gloss Level 2 - Velvet-Like Finish	Max.10	10 to 35
Gloss Level 3 - Eggshell Finish	10 to 25	10 to 35
Gloss Level 4 - Satin-Like Finish	20 to 35	min. 35
Gloss Level 5 - Traditional Semi-Gloss Finish	35 to 70	
Gloss Level 6 - Traditional Gloss	70 to 85	
Gloss Level 7 - High Gloss Finish	More than 85	

- .2 Gloss level ratings of painted surfaces as indicated in Drawings or as selected by Consultant as part of Colour Schedule.

#### 2.06 INTERIOR PAINTING SYSTEMS

- .1 All interior painting systems to be Premium Grade (typically one primer and two finish coats).
- .2 Only high-quality paint will be accepted (i.e. Dulux Diamond). Contractor-grade paint is not acceptable.
- .3 Provide and install priming coat(s) where recommended and required by Manufacturer.
- .4 Gloss level as specified in the Drawings or as selected by Consultant to be provided with Colour Schedule.

- .5 Concrete surfaces, including horizontal soffits:
  - .1 Dry fall (over manufacturer recommended primer) finish for exposed concrete ceilings.
- .6 Structural steel and metal fabrications:
  - .1 The use of temporary shop primers for all interior painted steel work will not be permitted unless of the type specified for such work within this Section. Where non-complying primers are used this section of work shall completely remove same from all surfaces and prepare and prime surfaces in accordance with the requirements of this Section, for painted steel work at no additional cost to the Owner.
- .7 Galvanized metal: doors, frames, railings, misc. steel, pipes, and ducts, not chromate passivated).
  - .1 INT 5.3C - Alkyd finish (over cementitious primer) – high traffic areas including doors, frames, and other metal components within occupants reach.
  - .2 Low Traffic areas including ducts, pipes, and misc. steel.
    - .1 INT 5.3J - Latex finish (over Water-Based (W.B.) galvanized primer).
    - .2 INT 5.3K - W.B. light industrial coating (over W.B. galvanized primer).
    - .3 INT 5.3L - Alkyd finish (over non-cementitious primer).
    - .4 INT 5.3M - High performance architectural latex (over W.B. galvanized primer) finish.
    - .5 INT 5.3N - Institutional low odour/ VOC (over W.B. galvanized primer) finish.
- .8 Dressed lumber: including doors, door and window frames, casings, mouldings:
  - .1 INT 6.3A - High performance architectural latex (over latex primer) finish.
- .9 Plaster and gypsum board: gypsum wallboard, drywall, "sheet rock type material", and textured finishes:
  - .1 INT 9.2B - High performance architectural latex (over latex primer/sealer) finish.

## **2.07 SOURCE QUALITY CONTROL**

- .1 Perform following tests on each batch of consolidated post-consumer material before surface coating is reformulated and canned. Testing by laboratory or facility which has been accredited by Standards Council of Canada.
  - .1 Lead, cadmium and chromium are to be determined using ICP-AES (Inductively Coupled Plasma - Atomic Emission Spectroscopy) technique no. 6010 as defined in EPA SW-846.
  - .2 Mercury is to be determined by Cold Vapour Atomic Absorption Spectroscopy using Technique no. 7471 as defined in EPA SW-846.
  - .3 Organochlorines and PCBs are to be determined by Gas Chromatography using Technique no. 8081 as defined in EPA SW-846.

### **3 EXECUTION**

#### **3.01 MANUFACTURER'S INSTRUCTIONS**

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

#### **3.02 GENERAL**

- .1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.

#### **3.03 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable to be painted in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate.
  - .2 Inform Owner's representative and Consultant of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.
- .2 Interior surfaces requiring repainting: inspected by painting contractor; notify Owner's representative and Consultant in writing of defects or problems, prior to commencing repainting work, or after surface preparation if unseen substrate damage is discovered.
- .3 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

#### **3.04 PREPARATION**

- .1 Protection (not applicable to new painting work):
  - .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces to the satisfaction of the Owner's representative and Consultant.
  - .2 Protect items that are permanently attached such as Fire Labels on doors and frames. Do not paint over.
  - .3 Protect factory finished products and equipment.
- .2 Surface Preparation:
  - .1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.

- .2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
- .3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Owner's representative and Consultant.
- .3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
  - .1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths, or compressed air.
  - .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
  - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
  - .4 Allow surfaces to drain completely and allow to dry thoroughly.
  - .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
  - .6 Use trigger operated spray nozzles for water hoses.
  - .7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.
- .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .5 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.
- .6 Carried out during shop priming: clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes, blowing with clean dry compressed air, or vacuum cleaning.
- .7 Touch up of shop primers with primer as specified.
- .8 Do not apply paint until prepared surfaces have been accepted by Owner's representative and Consultant. Primer may be applied prior to acceptance.

### 3.05 EXISTING CONDITIONS

- .1 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test" and report findings to Owner's representative and Consultant. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

### 3.06 APPLICATION

- .1 Method of application to be as approved by Consultant. Apply paint by brush, roller, air sprayer or airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Brush and Roller Application:
  - .1 Apply paint in uniform layer using brush and/or roller type suitable for application.
  - .2 Work paint into cracks, crevices and corners.
  - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
  - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
  - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Spray application:
  - .1 Provide and maintain equipment that is suitable for intended purpose, capable of atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
  - .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
  - .3 Apply paint in uniform layer, with overlapping at edges of spray pattern. Back roll first coat application.
  - .4 Brush out immediately all runs and sags.
  - .5 Use brushes and rollers to work paint into cracks, crevices and places which are not adequately painted by spray.
- .4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access.
- .5 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .7 Sand and dust between coats to remove visible defects.
- .8 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .9 Finish closets and alcoves as specified for adjoining rooms, unless otherwise noted.
- .10 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

### 3.07 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as indicated.

- .2 Unfinished areas (mechanical, electrical rooms): leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
- .3 Do not paint over nameplates.
- .4 Keep sprinkler heads free of paint.
- .5 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.
- .6 Paint fire protection piping when in exposed ceiling space, colour as selected by Consultant.
- .7 Paint disconnect switches for fire alarm system and exit light systems in red enamel in exposed ceiling space, unless otherwise selected by Consultant.
- .8 Paint natural gas piping when in exposed ceiling space, colour as selected by Consultant.
- .9 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.
- .10 Do not paint interior transformers and substation equipment.

### **3.08 SITE QUALITY CONTROL**

- .1 N/A

### **3.09 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.
- .3 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.10 RESTORATION**

- .1 Clean and re-install hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Owner's representative and Consultant. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Owner's representative or Consultant.

**END OF SECTION**

## **1 GENERAL**

### **1.01 SUMMARY**

- .1 This section includes fixed visual display boards with accessories and trim finishes.

### **1.02 RELATED REQUIREMENTS**

- .1 N/A

### **1.03 DEFINITIONS**

- .1 N/A

### **1.04 REFERENCE STANDARDS**

- .1 Canadian General Standards Board (CGSB):
  - .1 CAN/CGSB-12.1-2017, Safety Glazing
- .2 ULC Standards (ULC):
  - .1 CAN/ULC-S102-10, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
  - .2 CAN/ULC-S706.1:2016, Standard for Wood Fibre Insulating Boards for Buildings

### **1.05 ADMINISTRATIVE REQUIREMENTS**

- .1 N/A

### **1.06 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data: Product literature and data sheets for markerboards, including product characteristics, performance criteria, physical sizes, finishes, and limitations.
- .3 Shop Drawings:
  - .1 Show location of each component, dimensioned elevations, attachment details and:
    - .1 panel arrangements;
    - .2 hardware;
    - .3 accessories; and
    - .4 joint locations in markerboard facings, where required.
  - .2 Show locations and sizes of blocking and nailers. Include concealed blocking and reinforcement as required for secure anchorage.

- .4 Samples:
  - .1 Samples for verification: Manufacturer's standard or 300 mm x 300 mm samples to verify colour, pattern, and texture and finish.
    - .1 Submit samples for writing surfaces.
- .5 Manufacturer's Instructions:
  - .1 Special delivery, storage, and handling requirements.
  - .2 Installation instructions.
  - .3 Recommended sequencing.
  - .4 Cleaning procedures.

## **1.07 QUALITY ASSURANCE**

- .1 N/A

## **2 PRODUCTS**

### **2.01 PERFORMANCE/DESIGN CRITERIA**

- .1 Regulatory Requirements: To CAN/ULC-S102.
  - .1 Flame-spread rating: 25 maximum.
  - .2 Smoke developed classification: 50 maximum.

### **2.02 MATERIALS**

- .1 Glass Markerboards:
  - .1 Tempered safety glass: To CAN/CGSB-12.1, clear back-painted glass, non-magnetic, 6 mm thick, magnetic, maximum 7 mm thick with steel backing, flat polished edge with 1.5 mm bevel and eased corners.
- .2 Laminating Adhesive: Manufacturer's standard, water-resistant, where required.
- .3 Joint reinforcement: Concealed mechanical jointing system to provide straight, rigid, continuously supported, tight butt, flush joints at surface.
- .4 Anchor Clips, Brackets, and Fasteners: Concealed type recommended by markerboard manufacturer for fixed mounting.

### **2.03 MANUFACTURED UNITS**

- .1 Fixed Wall-Mounted Markerboards:
  - .1 Basis of Design: Clarus
  - .2 Dimensions: As indicated on Drawings.
  - .3 Edge trim: None.
  - .4 Magnetic.

### **2.04 FABRICATION**

- .1 Fabricate markerboard panels to sizes indicated on Shop Drawings.



- .2 Board Surfaces: Correct tooling marks, pits, chipping, scratches, or surface spalls.
- .3 Make finished panels flat and rigid and fit with joint reinforcement.
- .4 Fit joints between abutting markerboard panels with joint reinforcement.
- .5 Disassemble factory fitted assemblies if too large for shipment in one piece. Reassemble on site.

## **2.05 FINISHES**

- .1 Writing Surface Finishes:
  - .1 Glass Markerboards:
    - .1 Finish: Smooth, intended for dry-erase markers.
    - .2 Back-painted glass colour: Colour as selected by Consultant from manufacturer's full range; high or low gloss as selected by the Owner's representative and Consultant from manufacturer's full range of options.

## **2.06 ACCESSORIES**

- .1 Manufacturer's standard accessories with manufacturer's standard colours and finishes to match trim.
  - .1 Marker Trays: Aluminum, 1200 mm length, exposed corners rounded by approximately 25 mm radius.
    - .1 Confirm location prior to installation with Owner's representative and Consultant. Installation locations of on glass and on wall must be options to make a selection from.

## **3 EXECUTION**

### **3.01 INSTALLATION**

- .1 Install markerboards in accordance with manufacturer's instructions and reviewed Shop Drawings.
- .2 Install markerboards with bottom edges parallel to floor, plumb, level, and securely attached.
- .3 Align and level joints between adjoining panels.
- .4 Mechanical Attachment:
  - .1 To wood or sheet metal: Screws.
    - .1 Secure into framing members in stud walls and provided in-wall blocking, as required based on total weight, and as outlined in Shop Drawings.
  - .2 Use concealed brackets to reinforce and hold joints tight and flush.
  - .3 No exposed fasteners permitted.

### **3.02 CLEANING**

- .1 Perform in accordance with Section 01 74 00 - Cleaning, and:
  - .1 Use cleaning solution recommended by markerboard manufacturer.

- .2 Test cleaning materials in an inconspicuous area before cleaning whole board.

### **3.03 PROTECTION**

- .1 Prohibit workers from using, marring, scratching or staining markerboards.

### **3.04 SCHEDULES**

- .1 Markerboard Schedule:
  - .1 Type 1:
    - .1 Location: Conference Room R4-04.
    - .2 Size: As indicated in Drawings.

**END OF SECTION**

## **1 GENERAL**

### **1.01 SUMMARY**

- .1 Section includes:
  - .1 metal toilet compartments

### **1.02 RELATED REQUIREMENTS**

- .1 Section 05 50 00 - Metal Fabrications
- .2 Section 06 10 53 - Miscellaneous Rough Carpentry
- .3 Section 09 22 16 - Non-Structural Metal Framing
- .4 Section 10 28 00 - Toilet, Bath, and Laundry Accessories

### **1.03 DEFINITIONS**

- .1 Toilet compartment: Synonymous with toilet stall and water-closet stall.

### **1.04 REFERENCE STANDARDS**

- .1 ASTM International (ASTM):
  - .1 ASTM A240/A240M-24, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
  - .2 ASTM A480/A480M-24, Standard Specification for General Requirements for Flat-Rolled Stainless and Heat Resisting Steel Plate, Sheet, and Strip
  - .3 ASTM A666/A666M-24, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
- .2 CSA Group (CSA):
  - .1 CSA B651-18, Accessible design for the built environment
  - .2 CSA/ASC B651:23, Accessible design for the built environment

### **1.05 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination:
  - .1 Coordinate with Section 05 55 00 Metal Fabrications for overhead steel supports for ceiling-hung compartments.
  - .2 Coordinate with Section 06 10 53 - Miscellaneous Rough Carpentry and Section 09 22 16 - Non-Structural Metal Framing for blocking in partitions required to anchor metal toilet compartments.
  - .3 Coordinate with Section 10 28 00 - Toilet, Bath, and Laundry Accessories for reinforcement within metal toilet compartment panels.

### **1.06 ACTION AND INFORMATIONAL SUBMITTALS**

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

- .2 Product data: Product literature and data sheets for toilet compartments, including product characteristics, performance criteria, physical sizes, finishes, hardware, and limitations.
- .3 Shop drawings:
  - .1 Show dimensions and construction details of toilet compartments.
  - .2 Indicate fabrication details, plans, elevations, hardware, reinforcements, installation details, and door swing directions.
  - .3 Show locations and sizes of blocking and nailers. Include concealed blocking and reinforcement specified in other sections.
  - .4 Show locations of floor drains, toilets, and urinals.
  - .5 Show locations of toilet accessories attached to and penetrating toilet compartments. Use standard locations and standard accessory types regardless if accessory will be Contractor or Owner provided.
  - .6 Indicate weight of ceiling-hung toilet compartments. Provide all information as may be requested by engineer designing ceiling-hung support components.
  - .7 Show ceiling grid, ceiling-mounted items and overhead support or bracing locations.
- .4 Samples:
  - .1 Samples for verification: Manufacturer's standard, minimum 100 mm × 100 mm samples to verify specified colours, patterns, and textures, and finishes.
    - .1 Samples may not be returned.
- .5 Manufacturer's instructions:
  - .1 Special delivery, storage, and handling requirements.
  - .2 Installation instructions.
  - .3 Recommended sequencing.
  - .4 Cleaning procedures.

#### **1.07 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and maintenance data:
  - .1 Include, in the operation and maintenance manual, manufacturer's maintenance instructions and recommended cleaning materials and methods.

#### **1.08 MAINTENANCE MATERIAL SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

## **1.09 QUALITY ASSURANCE**

- .1 Obtain toilet compartments and all associated accessories from a single manufacturer.

## **1.10 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements, and:
  - .1 Manufacturer's requirements and written instructions.

## **2 PRODUCTS**

### **2.01 METAL TOILET COMPARTMENT SYSTEMS**

- .1 Metal toilet compartments:
  - .1 Configuration: Ceiling-hung.
  - .2 Basis of Design: ASI Global Partitions, an ASI Group company; stainless steel partition or other comparable product from the following manufacturers:
    - .1 Hadrian Inc.
    - .2 Metpar Corp.
    - .3 Other accepted equivalents.
  - .3 Performance/design criteria: Toilet compartments to carry grab bar loads indicated in Section 10 28 00 - Toilet, Bath, and Laundry Accessories without deformation.

### **2.02 MATERIALS**

- .1 Stainless steel sheet: To ASTM A240/A240M or ASTM A666/A666M, Type 304 Manufacturer's standard where accepted in writing by Consultant.
  - .1 Finish: Satin.
  - .2 Panel and door metal thickness: 0.79 mm minimum.
  - .3 Pilaster metal thickness: 1.27 mm minimum.
- .2 Stainless steel castings: To ASTM A743/A743M, Manufacturer's standard.
- .3 Core for panels: Manufacturer's standard sound-deadening honeycomb of resin-impregnated kraft paper, cell size maximum 25 mm, both faces with kraft paper. Thickness as required to provide manufacturer's standard finished thickness for doors and pilasters.
- .4 Hardware above ceiling: Steel mounting bar, threaded rods, and related hardware to connect to structural supporting members above finished ceiling. See Section 05 50 00 - Metal Fabrications for structural members.

## 2.03 FABRICATION

- .1 Doors, panels, and pilasters:
  - .1 Doors, panels, thickness: 25 mm.
  - .2 Pilasters, thickness: 32 mm.
  - .3 Provide doors, panels, and pilasters with finished surfaces free of creases, ripples, pitting, fabrication marks, and stains.
    - .1 Pre-drill holes for hardware and fittings.
  - .4 Fabricate panels with stainless steel sheet faces pressure bonded to structural cellular kraft paper cores.
    - .1 Form and interlock closed edges. Spot weld edges, grind welds smooth.
    - .2 Mitre and weld corners, grind welds smooth.
    - .3 Provide internal reinforcement at corners and at locations of attached hardware, fittings, and other accessories.
      - .1 Temporarily mark locations of reinforcement for compartment-mounted accessories.
  - .5 Fabricate compartments without gaps between panels and pilasters, and without sightlines.
  - .6 Door size: 610 mm wide × 1475 mm high, nominal.

## 2.04 FINISHES

- .1 Stainless steel finish: To ASTM A480/A480M.
  - .1 No. 4 Finish, general purpose polished finish.

## 2.05 ACCESSORIES

- .1 Hinges:
  - .1 Heavy duty, close by gravity, manufacturer's standard privacy, full-length piano hinge.
  - .2 Finish: Stainless steel.
  - .3 Door swing: As indicated on Drawings.
  - .4 Adjustable to hold door open at any angle up to 90 degrees
- .2 Latch sets:
  - .1 Turn latch, accessible function in accordance with CSA/ASC B651, built-in, keeper and bumper, stainless steel.
- .3 Wall mounting hardware: Bracket channels, full-length of panel.
  - .1 Material: Stainless steel extrusion or casting.
- .4 Coat hooks: Combination hook and rubber door bumper, maximum 40 mm projection from surface.
  - .1 Material: Stainless steel.

- .5 Pilaster shoes: Mechanically attach to inside face of pilaster with fasteners.
  - .1 Material: Stainless steel, satin finish.
  - .2 Thickness: minimum 0.79 mm.
  - .3 Height: 100 mm.
- .6 Privacy trim: manufacturer's standard profile, material to be stainless steel.
- .7 Fasteners: Screws and bolts.
  - .1 Material: Stainless steel.

### **3 EXECUTION**

#### **3.01 EXAMINATION**

- .1 Verification of conditions:
  - .1 Verify substrate and project conditions in accordance with Section 01 71 00 - Examination and Preparation, and:
    - .1 Verify wall and floor tile finishes are installed.
    - .2 Verify painting is complete.
    - .3 Ensure blocking in walls and structure above line of finished ceiling are installed.
    - .4 Verify field dimensions align with shop drawing dimensions and requirements.

#### **3.02 ERECTION**

- .1 General installation:
  - .1 Install toilet compartments as indicated on Drawings, in accordance with manufacturer's instructions and reviewed shop drawings.
  - .2 Anchor mounting brackets to concrete or masonry surfaces using screws and shields.
  - .3 Anchor mounting brackets to blocking or backing in hollow walls using bolts and toggle-type anchors.
  - .4 Anchor mounting brackets to steel supports with threaded rods, nuts, and washers or bolts in threaded holes, as recommended by Manufacturer.
  - .5 Locate fasteners for wall mounted brackets at wall tile joints where possible.
  - .6 Secure compartment pilasters, and vertical posts if required, to structural supports above ceiling finish.
  - .7 Attach panels and pilasters to brackets with self-drilling tapping screws or through-type sleeve bolts and nuts, as recommended by manufacturer and designated design engineer.
  - .8 Leave approximately 13 mm space between wall and panel or end pilaster.
  - .9 Install compartments secure, plumb, and square.

- .10 Adjust for floor and ceiling variations with screw jacks through steel saddles connected to pilaster.
  - .1 Conceal ceiling anchorage with pilaster shoes.
- .11 Install doors with bottoms 305 mm above finished floor.
- .12 Install each door with hinges, latch sets, and each compartment with coat hook mounted on door.
  - .1 Latch set mounting height: Manufacturer's standard height.
  - .2 Coat hook mounting height: 1500 mm above finished floor, unless otherwise recommended by Manufacturer.
- .13 Adjust hardware and align components for smooth, quiet, correct function.
  - .1 Outward swinging doors: Set door to self-close with door ajar maximum 50 mm beyond jamb.
- .14 Install door hooks and bumpers.
- .15 Lubricate hardware and other moving parts.
- .2 Ceiling-hung compartments installation:
  - .1 Provide templates or drilling dimensions for locating threaded studs through finished ceilings.
  - .2 Secure pilasters to supporting structural framing using pilaster hangers.
  - .3 Install so pilaster hangers do not transmit load to finished ceilings.
  - .4 Secure pilaster shoes in position.
  - .5 Set bottoms of doors level with bottom of pilasters when doors are in closed position.

### 3.03 CLEANING

- .1 Perform in accordance with Section 01 74 00 - Cleaning, and:
  - .1 Clean surfaces after installation using manufacturer's recommended cleaning procedures.
  - .2 Clean and polish hardware and stainless steel components.

**END OF SECTION**



## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 08 80 00 - Glazing.

### **1.02 REFERENCE STANDARDS**

- .1 Aluminum Association (AA)
  - .1 AA DAF45-R03, Designation System for Aluminum Finishes, 9th Edition
- .2 ASTM International (ASTM)
  - .1 ASTM A653/A653M-20, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  - .2 ASTM E90-09, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
- .3 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC-S102-10, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies

### **1.03 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature and data sheets for demountable partitions and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
  - .1 Submit shop drawings indicating all demountable walls in plan, elevation and section and details.
  - .2 Indicate wall system for each unique opening, including provided STC value of assembly.
  - .3 Include information about doors, door openings, door hardware, etc. as required to provide a complete system.
  - .4 Use room numbers from Contract Documents to incorporate into shop drawings for reference of spaces and locations.
- .4 Samples:
  - .1 Submit one representative model of each type of partition.
    - .1 Indicate basic construction, glazed sections, door frames, trim, and finishes.
  - .2 Submit 200 x 300 mm samples of panel colours, textures and finishes and 300 mm long samples of trim options for colour selection by Consultant.
  - .3 Submit sample of ceiling fixing device.

.5 Test Reports:

- .1 Submit test reports in accordance with Section 01 43 00 - Quality Assurance, from approved independent testing laboratory, certifying partition system complies with sound transmission rating as specified.

**1.04 QUALITY ASSURANCE**

.1 Manufacturer Qualifications:

- .1 Over ten (10) years in industry producing similar product.

.2 Installer Qualifications:

- .1 Engage an experienced installer who has successfully completed a minimum of five (5) demountable partition installations similar in material, design and extent to that indicated for this Project within the last five (5) years.
  - .1 Provide documentation of experience if requested by Consultant.
- .2 Is accepted, certified, and/or trained by the Manufacturer.

**1.05 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect stud type demountable partitions from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

**2 PRODUCTS**

**2.01 SYSTEM DESCRIPTION**

- .1 Basic system to be ceiling height partitions, from single manufacturer, of metal framing filled with glazing panels.
- .2 Basis of Design:
  - .1 Haworth, Enclose
    - .1 Type DW-1: Single Glazed, Frameless, 12 mm Tempered – 36 STC
      - .1 Minimum STC that will be accepted for the single glazed system is 36 STC.
    - .2 Type DW-2: Double Glazed, Frameless, 10 mm Tempered + 12 mm Tempered – 47 STC
      - .1 Minimum STC that will be accepted for the double glazed system is 44 STC.

- .3 Other acceptable manufacturers:
  - .1 It is the Contractor's responsibility to ensure all alternative manufacturers besides basis of design have systems that comply with the basis of design standards and requirements as outlined in Design Requirements portion of this Section, including the manufacturers listed below.
  - .2 Teknion
  - .3 DIRT
  - .4 KI Walls
  - .5 MyWall
  - .6 Submitted and accepted equivalents.

## 2.02 DESIGN REQUIREMENTS

- .1 Partition assembly: non-combustible construction, fully demountable and relocatable, extend in four directions without disturbing other panels, accommodate floor/ceiling height variations of 25 mm.
  - .1 If Contractor carried system only accommodates height variations less than 25mm, the product will be considered acceptable, provided the Contractor includes for floor leveling to achieve the acceptable height variation of the provided system at no additional cost to the Owner.
- .2 Components: Distortion free, uniform in dimension, construction and appearance, made to suit specific function and have been proven in use.
- .3 Partition heights:
  - .1 Bulkhead Ceiling height: Refer to Drawings.
- .4 Partition Module: equally sized, sizing determined by Manufacturer as it relates to length of partitions, transportation limitations, etc.
- .5 Minimum sound transmission rating of installed panel partition:
  - .1 Type DW-1: STC 36, tested to ASTM E90, location as indicated in Drawings and Section 01 23 00 Alternatives.
  - .2 Type DW-2: STC 44, tested to ASTM E90, location as indicated in Drawings and Section 01 23 00 Alternatives.
- .6 Partition Frame System:
  - .1 Black and silver / clear anodized frame finish options at minimum for Consultant to select from.
  - .2 Accommodate electrical, telephone, IT wiring.
  - .3 Ability to accommodate mounting of booking system IT technology and routing of associated wiring to verticals adjacent to doors. Booking system technology to be provided by Owner. Integration could take place during construction or be retrofitted by Owner after project completion.
  - .4 Ability to accommodate card reader access and related electric strike. Integration could take place during construction or be retrofitted by Owner after project completion.

- .5 No visual difference in frame thickness will be considered acceptable to achieve both Type DW-1 and Type DW-2.
- .6 Compressible seals at frame perimeters to ensure complete seal between demountable partitions and surrounding gypsum board and metal stud walls, ceiling bulkheads and floors.
  - .1 Frame capping / enveloping gypsum board wall assemblies is considered unacceptable.
- .7 Glazing:
  - .1 Joints between Glass Panes: Frameless glass joints for intermediate joints along glass panes along continuous glass elevations.
- .8 Transition to Perpendicular Walls: Fly-by Transition (coordinated with standard gypsum board and stud wall types):
  - .1 Maximum 25 mm wide gasket or compressed seal on back side of glass. Glass to remain continuous across corridor-facing elevation. No solid frame or solid cover will be accepted that breaks the continuous glass elevation.
- .9 Doors:
  - .1 Thin profile metal frame with full size glass lite door style.
  - .2 Complete with all gaskets, seals, drop seals, etc. to ensure STC rating of system is maintained.
- .10 Door Hardware:
  - .1 Complete hardware offerings to comply with requirements in Door Schedule and as outlined in this specification section.

## 2.03 MATERIALS

- .1 Glass and Glazing Materials: In accordance with Section 08 80 00 - Glazing.
  - .1 DW-1: Type 1 or Type 2, as required to achieve STC value.
  - .2 DW-2: Type 1 and/or Type 2, double glazed, as required to achieve STC value.
  - .3 Glazing Material: furnish neoprene glazing gaskets for setting glass or other type as recommended by demountable wall system Manufacturer.
- .2 Accessories: Miscellaneous trim, bracing, fasteners, clips, and other accessories for installation as recommended by partition manufacturer.

## 2.04 COMPONENTS

- .1 Glazing frames: as required for Manufacturer's system.
- .2 Partition door: extruded aluminum frame with glass lite.
  - .1 Prepare for hardware specified in Drawing Door Schedule and elsewhere in this section.
  - .2 All hardware to be provided and installed by demountable partition manufacturer or be confirmed by demountable partition manufacturer to incorporate seamlessly into the demountable partition system.
  - .3 Include continuous vinyl seal on door stop.

- .4 Hardware:
  - .1 Hinges: Manufacturer's standard in type and quantity.
  - .2 Seals, gaskets, sweeps and other accessories as required to achieve specified STC.
  - .3 Handle: Architectural long pull, 1.5m in length, located from finish floor to top of pull, finish as selected by Consultant (brushed nickel and black must be available options), lever style handle should Owner require during Construction or as retrofit to work with electric strike.
  - .4 Latch: Roller catch (basis of design), electric strike capabilities should Owner require during Construction or as retrofit.
  - .5 Cylinder lock: Where specified, refer to Door Schedule in Drawings.
    - .1 Coordinate cylinder with Owner's keying requirements and standards.
  - .6 Stops: Type as specified in Drawing Door Schedule. Minimum for each door to be floor stop.
- .5 Colour & Finish: Match that of framing system, minimum of black and silver / clear anodized to be provided for Consultant's selection.

### **3 EXECUTION**

#### **3.01 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates and surfaces to receive demountable partitions previously installed under other Sections are acceptable for product installation in accordance with manufacturer's instructions.

#### **3.02 ERECTION**

- .1 Install partition after floor finishes, in accordance with manufacturer's instructions.
- .2 Fasten runners to floors, ceiling and abutting vertical surfaces at 600 mm on centre, in accordance with manufacturer's instructions.
- .3 Erect partitions, plumb, square, and level.
  - .1 Accurately fit and fasten to abutting surfaces.
  - .2 Shim under partitions at uneven floors to ensure level installation.
- .4 Install continuous light/sound seals at junction of ceiling height partitions with floors, ceilings, and vertical surfaces.
- .5 Install acoustical insulation and sealant in sound rated partitions to correspond with tested assembly.
  - .1 Install panels in accordance with manufacturer's printed instructions. Apply panels full height floor to ceiling.
  - .2 Install glass in accordance with Section 08 80 00 – Glazing and demountable wall system Manufacturer requirements.

**3.03 CLEANING**

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - Cleaning.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 00 - Cleaning.

**END OF SECTION**

## **1 GENERAL**

### **1.01 SUMMARY**

- .1 Section includes:
  - .1 Washroom accessories to be provided and installed by Contractor are contained within this specification section.
  - .2 Washroom accessories to be supplied and installed by the Owner:
    - .1 Loose waste receptacles
    - .2 Soap dispensers
    - .3 Toilet paper dispensers
    - .4 Sanitary napkin disposals
    - .5 Hand sanitizer dispensers

### **1.02 RELATED REQUIREMENTS**

- .1 Section 06 10 53 - Miscellaneous Rough Carpentry

### **1.03 DEFINITIONS**

- .1 N/A

### **1.04 REFERENCE STANDARDS**

- .1 CSA Group (CSA):
  - .1 CSA B651-18, Accessible design for the built environment
  - .2 CSA/ASC B651:23, Accessible design for the built environment

### **1.05 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination:
  - .1 Coordinate with Section 06 10 53 - Miscellaneous Rough Carpentry and Section 09 22 16 - Non-Structural Metal Framing for framing, blocking, or backing required to anchor wall-mounted accessories.
  - .2 Coordinate with Section 09 21 16 - Gypsum Board Assemblies for installation of manufacturers' steel anchor plates before installing gypsum board.
  - .3 Coordinate with Section 10 21 13.13 - Metal Toilet Compartments for reinforcement for compartment-mounted accessories.
  - .4 Deliver inserts and rough-in frames to Place of the Work at appropriate time for building-in. Provide templates, details, and instructions for building in anchors and inserts.
  - .5 Confirm exact locations with the Consultant prior to installation of blocking.

### **1.06 ACTION AND INFORMATIONAL SUBMITTALS**

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

- .2 Product data: Product literature and data sheets for each accessory, including product characteristics, performance criteria, physical sizes, finishes, accessories and limitations.
- .3 Shop drawings:
  - .1 Show location of each component, dimensioned plans and elevations, mounting heights, and attachment details.
  - .2 Show rough-in frames for recessed and semi-recessed installations, and each type of associated wall construction.
  - .3 Show locations and sizes of framing, blocking, or backing required for wall-mounted accessories, including concealed items specified in other sections.
- .4 Samples:
  - .1 N/A
- .5 Manufacturer's instructions:
  - .1 Special delivery, storage, and handling requirements.
  - .2 Installation instructions.
  - .3 Recommended sequencing.
  - .4 Cleaning procedures.

#### **1.07 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and maintenance data:
  - .1 Include, in the operation and maintenance manual, manufacturer's operation and maintenance instructions and recommended cleaning materials and methods.

#### **1.08 WARRANTY**

- .1 Submit warranty certificates from Product manufacturer(s) as follows:
  - .1 Silver coating on mirrors: 15 years.

#### **1.09 MAINTENANCE MATERIAL SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Tools:
  - .1 Submit two (2) complete sets of special tools and master keys for locked / keyed accessories.
  - .2 Supply special tools required for assembly, disassembly, and maintenance of accessories.



## **2 PRODUCTS**

### **2.01 GENERAL REQUIREMENTS**

- .1 Regulatory requirements:
  - .1 Products requiring electrical connection:
    - .1 Listed and certified by a certification body accredited by the Standards Council of Canada (SCC) or acceptable to authority having jurisdiction as suitable for purpose specified.
  - .2 Provide rough-in frames for accessories semi-recessed or recessed into walls.
  - .3 Manufacturer's identification labels not permitted on visible surfaces.

### **2.02 MATERIALS**

- .1 Aluminum, extruded: To ASTM B221 or ASTM B221M.
- .2 Steel sheet: To ASTM A653/A653M, commercial quality galvanized, with Z275 coating designation.
- .3 Stainless-steel sheet: To ASTM A240/A240M or ASTM A666/A666M, Type 304.
  - .1 Finishes: To ASTM A480/A480M.
    - .1 No. 4 Finish, general purpose polished finish.
- .4 Stainless-steel tubing: To ASTM A269/A269M, seamless, Grade TP304.
- .5 Stainless-steel castings: To ASTM A743/A743M.
- .6 Zinc aluminum magnesium and copper alloy (Zamac) castings: To ASTM B86.

### **2.03 TOILET ACCESSORIES**

- .1 Hand dryers:
  - .1 Performance/design criteria:
    - .1 Basis of Design: World Dryer, VERDEdri
    - .2 Or approved equivalent
  - .2 Mounting: Surface.
  - .3 Filter: HEPA
  - .4 Operation:
    - .1 Automatic: Infrared sensor-actuated.
  - .5 Electrical: 120V/20A/60Hz
  - .6 Finish: Brushed Stainless Steel
- .2 Splash Plate:
  - .1 Size: 300mm x 600mm
  - .2 Material: Stainless steel
  - .3 Quantity: One (1) splash plate below each hand dryer.

- .3 Mirrors: Refer to Section 08 80 00.
- .4 Paper towel dispensers: Hinged front panel, refill indicator slot, and lockable access.
  - .1 Performance/design criteria:
    - .1 Counter-mounted Towel dispenser: Operable with one hand to dispense towels.
    - .2 Basis of Design: Bobrick B-526
    - .3 Or approved equivalent
  - .2 Material: Stainless-steel sheet
    - .1 Finishes: Satin.
  - .3 Nominal dimensions: 325 mm wide × 150 mm high × 430 mm deep.
  - .4 Mounting: Recessed.
  - .5 Paper towel type: Folded.
  - .6 Capacity:
    - .1 Folded: 300 C-fold, 400 multifold
  - .7 Operation: Manual.
  - .8 Coordinate with Section 06 40 00 Architectural Woodwork.

#### 2.04 FABRICATION

- .1 Weld and grind joints of fabricated components flush and smooth. Fabricate with mechanical fasteners only where acceptable to the Consultant.
- .2 Fabricate manufactured units so exposed metal edges are safe to touch, rolled or smooth finished, and free from burrs.
- .3 Wherever possible form exposed surfaces from a single sheet, free of visible joints.
- .4 Brake form sheet metal work with approximately 1.5 mm radius bends.
- .5 Form surfaces flat without distortion, scratches, or dents.
- .6 Back paint components where contact is made with building finishes where electrolysis could otherwise occur.
- .7 Factory assemble components and package with anchors and fittings.
- .8 Provide steel anchor plates and components for installation on studding and building framing.

#### 2.05 ACCESSORIES

- .1 Fasteners: Corrosion-resistant, tamper-resistant screws and bolts.
  - .1 Expansion shields: Manufacturer-recommended for component and its intended use.
  - .2 Exposed fasteners: Match accessory finish.
- .2 Anchor plates: Steel sheet purpose-built plates with threaded studs or plugs.

### **3 EXECUTION**

#### **3.01 EXAMINATION**

- .1 Verification of conditions:
  - .1 Verify substrate and project conditions in accordance with Section 01 71 00 - Examination and Preparation, and:
    - .1 Verify walls and partitions have framing, blocking, backing, or anchor plates where required.

#### **3.02 INSTALLATION**

- .1 Install accessories where located on Drawings, in accordance with manufacturer's instructions and reviewed Shop Drawings.
- .2 Secure accessories plumb, level, and rigidly in place.
  - .1 Concrete: Use bolts with expansion sleeves set into drilled holes.
  - .2 Hollow masonry units: Use toggle bolts drilled into cell cavity.
  - .3 Solid masonry: Use bolts with expansion sleeves set into drilled holes.
  - .4 Solid stone masonry: Use bolts with expansion sleeves set into drilled holes.
  - .5 Existing gypsum board walls: Use toggle bolts drilled into wall cavity.
  - .6 Existing plaster walls: Use toggle bolts drilled into wall cavity.
  - .7 Toilet compartments: Use male-to-female through bolts.
  - .8 Adhesives: High-pressure bonding type, suitable for materials being bonded. Contact adhesives not acceptable.
- .3 Centre mirrors over lavatories.
- .4 Fill units with necessary supplies shortly before final cleaning.

#### **3.03 ADJUSTING**

- .1 Adjust accessory components for correct function and operation in accordance with manufacturer's instructions.
- .2 Lubricate moving parts to operate smoothly and fit accurately.

#### **3.04 CLEANING**

- .1 Clean in accordance with Section 01 74 00 – Cleaning
- .2 Remove all protective films as part of the Final Cleaning.

#### **3.05 PROTECTION**

- .1 Protect partially installed and completed work from damage in accordance with Section 01 76 00 - Protecting Installed Construction.

#### **3.06 TOILET ACCESSORIES SCHEDULE**

- .1 General: Mounting heights and controls heights specified indicate distance above finished floor.

- .2 Coat hooks installed in toilet compartments are specified in Section 10 21 13 - Metal Toilet Compartments.
- .3 Hand dryers (HD):
  - .1 Locations:
    - .1 One in each gendered washroom.
    - .2 Mounting height: 1100 mm maximum to the point of interaction.
- .4 Splash Plate (SP):
  - .1 Locations:
    - .1 One directly under each hand dryer.
- .5 Mirrors, framed (MIR):
  - .1 Locations:
    - .1 One at each gendered washroom.
- .6 Paper towel dispensers (PTD):
  - .1 Locations:
    - .1 One in R4-03 the Hub kitchenette millwork.

**END OF SECTION**

## **1 GENERAL**

### **1.01 SUMMARY**

.1 Section Includes:

- .1 Manually-operated roller window shades with single rollers.

### **1.02 RELATED REQUIREMENTS**

.1 N/A

### **1.03 REFERENCE STANDARDS**

.1 ASTM International (ASTM):

- .1 ASTM E2180-18, Standard Test Method for Determining the Activity of Incorporated Antimicrobial Agent(s) In Polymeric or Hydrophobic Materials
- .2 ASTM G21-15e1, Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi

.2 Health Canada (HC):

- .1 SOR/2019-97, Corded Window Coverings Regulations

.3 ULC Standards (ULC):

- .1 CAN/ULC-S109-14, Standard Method for Flame Tests of Flame-Resistant Fabrics and Films

### **1.04 ADMINISTRATIVE REQUIREMENTS**

.1 Coordination:

- .1 Coordinate with existing site conditions and proposed ceiling heights for mounting options and compatibility.
- .2 Coordinate with Manufacturer's blocking requirements for installation and field conditions. Provide blocking following the Manufacturer's recommendations / requirements.

.2 Sequencing:

- .1 Perform work of this section after completion of interior painting and other finishing work within the vicinity.

### **1.05 ACTION AND INFORMATIONAL SUBMITTALS**

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

- .2 Product Data: Product literature and data sheets for roller window shades, including product characteristics, performance criteria, physical sizes, finishes, example warranty documentation, and limitations.

- .3 Shop Drawings:
  - .1 Indicate product details, installation details, operational clearances, and relationship to adjacent Work.
    - .1 Indicate required clearances from glazing.
    - .2 Identify shade material on each roller, the shade material's orientation on the rollers, and seam and batten locations.
    - .3 Indicate constructed opening sizes on plans and sections.
    - .4 Identify profiles, extrusions, etc. of existing conditions directly adjacent to shade location to inform mounting requirements, available depths, etc.
  - .2 Include a Location Schedule showing locations, sizes, and quantities of roller window shades. Use same room designations as the Drawings.
  - .3 Show locations and sizes of blocking reinforcement.
- .4 Samples:
  - .1 Samples for initial selection: Full range of samples, representing available colours, patterns, textures, and finishes.
    - .1 Submit samples for:
      - .1 light filtering fabrics; and
      - .2 exposed metal finishes.
  - .2 Samples for verification: Manufacturer's standard size, 150 mm x 150 mm minimum, samples to verify selected colours, patterns, and textures, and finishes.
    - .1 Submit samples for:
      - .1 light filtering fabrics; and
      - .2 exposed metal finishes.
- .5 Manufacturer's Instructions:
  - .1 Special delivery, storage, and handling requirements.
  - .2 Installation instructions.
  - .3 Recommended sequencing.
  - .4 Cleaning procedures.

#### **1.06 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: Include, in the operation and maintenance manual, manufacturer's maintenance and operating instructions and recommended cleaning materials and methods.

### 1.07 QUALITY ASSURANCE

- .1 Manufacturer Requirements: Minimum five (5) years of experience in the industry of manufacturing and producing window roller shades, of similar type and quality outlined in this section.
- .2 Installer Requirements: Minimum three (3) years of experience installing roller window shades of similar type.

### 1.08 WARRANTY

- .1 Submit warranty information in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Manufacturer Warranty: Manufacturer's premium warranty document, executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights the Owner may have under the Contract.
  - .1 Manufacturer's warranty period: five (5) years from date of Substantial Performance of the Work.

## 2 PRODUCTS

### 2.01 PERFORMANCE/DESIGN CRITERIA

- .1 Design blinds to:
  - .1 Allow wear-susceptible parts to be replaceable by either the user or the manufacturer.
  - .2 Permit effective disassembly of components to permit recycling of materials for which recycling markets exist.
  - .3 Include stamps on all major plastic components indicating composition code to facilitate recycling efforts.
  - .4 Mounting: Inside.
    - .1 Opaque shade materials: Provide minimum 51 mm clearance between shade cloth and inside face of glazing unless otherwise directed by Consultant.
- .2 Single-Source Responsibility: Obtain each type of roller window shade and other components from one Supplier and a single manufacturer, or by manufacturers approved by the system manufacturer as compatible with other system components. Include all Products required to meet warranty requirements.

### 2.02 REGULATORY REQUIREMENTS

- .1 Consumer Product Safety: In accordance with SOR/2019-97.
- .2 Flammability Requirements: In accordance with CAN/ULC-S109.

## 2.03 MANUALLY-OPERATED ROLLER WINDOW SHADES WITH SINGLE ROLLER

- .1 Chain-and-Clutch Operating Mechanisms: Continuous-loop bead chain and clutch that stops shade movement when bead chain is released, shade to be permanently adjusted and lubricated.
  - .1 Bead chains: #10 stainless steel rated to minimum 400 N breaking strength, with pull chain tensioning device in accordance with ANSI/WCMA A100.1.
    - .1 Loop length: Full length of roller shade.
    - .2 Limit stops: Allow shade to stop when chain is released. Provide limit stops to prevent shade from being raised or lowered too far.
    - .3 Loop safety:
      - .1 Basis of Design: SunGlow, Safety Shield Chain, or approved equivalent.
      - .2 Maintain maximum 220 mm exposed chain length in accordance with Health Canada, SOR/2019-97.
    - .4 Chain-retainer type: Chain tensioner.
  - .2 Rollers: Corrosion-resistant steel or extruded aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms, and weights and widths of shade bands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shade cloth for service.
    - .1 Roller drive-end location: Right side of interior face of shade.
    - .2 Direction of shade cloth roll: Regular, from back/exterior face of roller or Reverse, from front/interior face of roller, as selected by Consultant during Shop Drawing and submittal review.
    - .3 Shade cloth-to-roller attachment: Manufacturer's standard method. Adhesive attachment is not acceptable.
- .3 Shade Material: Light filtering.

## 2.04 SHADE MATERIALS

- .1 Material: PVC-coated polyester or polyester.
- .2 Light Filtering Shades:
  - .1 Light filtering shade cloth openness to be selected by Owner and Consultant during shop drawing review.
- .3 Shade Cloth Bottom/Hem Bar: Extruded aluminum. Provide shade bar enclosed in sealed pocket of shade band material, with sides stitched closed.
- .4 Pattern/Colour: As selected by the Consultant from manufacturer's full colour range.
  - .1 Basis of Design: Sunglow, CS 103, 5 Dark Grey, 3% Open, or approved equivalent.

## 2.05 FINISHES

- .1 Exposed Metal Trim and Accessories: As selected by the Consultant from manufacturer's full colour range, including anodized and painted options.
  - .1 Colour options that must be available, but not limited to: White, Clear Anodized.



## **2.06 ACCESSORIES**

- .1 Mounting Hardware: Provide corrosion resistant brackets or endcaps compatible with roller assembly, operating mechanism, installation accessories, mounting location, and conditions indicated. Provide hardware to allow field adjustment or removal of shade roller tube and other operable hardware components without removal of brackets and end-or centre supports.
- .2 Front Fascia: L-shaped aluminum extrusion to conceal shade roller and hardware that snaps onto end caps without requiring exposed fasteners of any kind. Provide manufacturer's standard height fascia as required to conceal roller and shade band assembly when shade is fully open.
- .3 Endcaps: Extruded aluminum with universal design suitable for mounting to window mullions, walls and ceilings. Provide size compatible with roller size. Provide end cap covers in a finish as selected by the Consultant from the Manufacturer's full standard range.
- .4 Chain Guards: Tested and meeting SOR/2019-97.

## **3 EXECUTION**

### **3.01 EXAMINATION**

- .1 Verification of Conditions:
  - .1 Verify substrate and project conditions in accordance with Section 01 71 00 - Examination and Preparation, and:
    - .1 There is no visual evidence of biological growth on roller shades.

### **3.02 INSTALLATION**

- .1 Install roller window shades in accordance with reviewed Shop Drawings and manufacturer's instructions.
- .2 Install roller window shades level, plumb, secure, and at proper height and location relative to window units.
- .3 Provide supplementary or miscellaneous items, including hardware, brackets, anchors, fasteners, and accessories required for a complete, finished installation.
  - .1 Install centre brackets, where required, to prevent headrail deflection.
  - .2 Install chain guards on all bead chains.
- .4 Isolate metal parts from direct contact with concrete, mortar, or dissimilar metals.
- .5 Adjust roller window shades for form, appearance, balance, and proper operating condition.

### **3.03 CLOSEOUT ACTIVITIES**

- .1 Training:
  - .1 Appoint manufacturer's authorized representative to train Owner's maintenance personnel in accordance with Section 01 79 00 - Demonstration and Training.

- .2 Instruct personnel to adjust, operate, and perform periodic maintenance on roller window shades.

**END OF SECTION**