

TOWN OF RICHMOND HILL

# Interior Alterations at Bayview Hill Community Centre

Issued for Tender

PROJECT NO: 60570019

March 2019

# Specifications

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1 General

**1.1 GENERAL CONDITIONS**

- .1 The General Conditions of the Stipulated Price Contract, Standard Construction Document, CCDC 2, 2008; and Supplementary Conditions, Section 00 73 00, will govern the work specified in each Section of the Specifications.

**1.2 THE CONTRACT DOCUMENTS**

- .1 Work will be performed under one Contract; the Contract will be in the form of the Agreement between Owner and Contractor, Canadian Standard Construction Document, CCDC 2, 2008, Stipulated Price Contract as amended by the Supplementary Conditions.
- .2 Division 1 General Requirements, of the Specification generally specify work and coordination of the work that is the direct responsibility of the Contractor but shall not be interpreted to define absolutely the limits of responsibility that must be established between the Contractor and his Subcontractors by their separate agreements.
- .3 Ensure that Subcontractors understand that the General Conditions of the Contract, and Division 1 General Requirements, apply to Sections of the Specification governing their work.
- .4 Ensure that the work includes all labour, equipment and products required, necessary or normally recognized as necessary for the proper and complete execution of the work of each trade.
- .5 Work in this Specification is divided into descriptive Sections which are not intended to identify absolute contractual limits between Subcontractor, nor between the General Contractor and his Subcontractors. The Contractor shall organize division of labour and supply of materials essential to complete the Project in all its parts and provide a total enclosure and protection from weather of interior spaces, as established in the General Conditions of the Contract.
- .6 As a result, the Consultant shall not be required to decide on questions arising with regard to agreements or contracts between the Contractor and Subcontractors or Suppliers, nor to the extent of the parts of the Work assigned thereto.
- .7 Further, no extra will be allowed as a result of the failure to coordinate and allocate the Work such that the Work is Provided in accordance with the Contract Documents.
- .8 Wherever the word "building" occurs in the Contract Documents it shall be taken to mean all the buildings included in the Contract.
- .9 Wherever in the Contract Documents the words "approval", "approved", "direction", "directed", "selection", "selected", "request", "requested", "report", and similar words are used, such approvals, directions, selections, requests and reports shall be given by the Consultant in writing unless specifically stated otherwise.
- .10 Wherever in the Contract Documents the word "supply" is used in any form, it shall mean that the work specified to be supplied includes delivery to site and unloading at location directed.
- .11 Wherever in the Contract Documents the word "installed" issued in any form, it shall mean that the work specified for installation includes uncrating, unpacking, etc; moving from stored location to place of installation; and installing to meet specified requirements.
- .12 Wherever in this Specification it is specified that work is to proceed or to meet approval, direction, selection or request of authorities having jurisdiction or others, such approval, direction, selection or request shall be in writing.
- .13 Wherever in this Specification or as directed by the Consultant it is specified that work shall be repaired, made good or replaced, it shall be performed without any additional cost to the Owner.
- .14 Whenever in the Specifications the term "and/or" is used, the Consultant shall decide which of the possible meanings, to be derived at from the sentence where this term occurs shall govern.

### **1.3 DIVISION 1. GENERAL REQUIREMENTS**

- .1 The provisions of all Sections of Division 01 shall apply to each Section of this Specification.

### **1.4 STANDARDS AND CODES**

- .1 Contract forms, codes, specifications, standards, manuals and installation, application and maintenance instructions referred to in these specifications, unless otherwise specified, amended or date suffixed, shall be latest published editions at Contract date.

### **1.5 LAWS, NOTICES, PERMITS AND FEES**

- .1 Comply with codes, by-laws, and regulations of authorities having jurisdiction over the Place of the Work. Codes and regulations form an integral part of the Contract Documents.
- .2 Permits:
  - .1 The Contractor shall obtain and pay for all permits, licenses, deposits and certificates of inspection as part of the Work, including permits for road closures.
  - .2 The Owner has initiated the permit application process for the following, but responsibility for completing the application process, including all associated costs and responsibilities, rests with the Contractor and is included as part of the Work:
    - .1 Refer also to Section 01 35 56 for permits required for road closure (Temporary Street Occupation Permit).
    - .3 Obtain permits required to execute work on municipal rights of way. Obtain damage deposits for sidewalks, roads and services, unless otherwise indicated.
  - .3 Arrange for inspection, testing and acceptance of the Work required by the authorities having jurisdiction. Be responsible for necessary preparations, provisions and pay costs.
  - .4 It is the responsibility of the Contractor to schedule notifications and inspections required by authorities having jurisdiction such that notifications can be properly received and that inspections can be properly undertaken without causing a delay in the Work. The Contractor, at no additional cost to the Owner, shall be solely responsible for any delay in the Work caused by failure to properly schedule required notifications and inspections.

### **1.6 DISCREPANCIES AND CLARIFICATIONS**

- .1 Advise Consultant of discrepancies discovered in requirements of the Contract Documents and request clarification from Consultant in written form.
- .2 Advise Consultant when clarifications are required pertaining to meaning or intent of requirements of Contract Documents and request clarification from Consultant in written form.
- .3 Do not proceed with related work until written clarification is provided by Consultant.
- .4 Failure to notify Consultant shall result in Contractor incurring responsibility for resulting deficiencies and expense at no additional cost to the Owner.
- .5 Written instructions issued by Consultant for the purpose of clarification, implicitly supersede applicable and relevant aspects of the Contract Documents irrespective of whether or not these documents are explicitly or specifically cited in clarification requests or clarification instructions.

### **1.7 WORK PERFORMED UNDER SEPARATE CONTRACTS**

- .1 Work not to be included in the Contract, as noted "NIC" on the Drawings, shall be governed by GC 3.2, Construction by Owner and Other Contractors, of the General Conditions.

### **1.8 WORK BY OWNER**

- .1 Permit the Owner and/or their contractors to inspect the work at any reasonable time, and to perform such work and install such equipment as the Owner may require.

**1.9 \*\*\*\*\*ITEMS SUPPLIED BY OWNER**

- .1 Certain items will be supplied by the Owner for installation in, and as part of, the Work. Refer to Schedule of Itemized Prices.
- .2 Install items supplied by Owner during the Work.
- .3 Coordinate shipping with the Owner. Items supplied by the Owner will be made available from the Owner's storage facility located in proximity to the Place of the Work: Contractor to arrange and pay cost of pick-up and shipping to the Place of the Work. Location of Owner's storage facility may change through the course of the Work to another nearby facility.
- .4 Store items supplied by Owner at the Place of the Work and protect from damage in the same manner as items supplied by the Contractor.
- .5 Install completely, and leave in full operating condition, in accordance with manufacturer's directions.
- .6 Items to be supplied by the Owner for installation by the Contractor as part of the Work include:
  - .1 Benches and assembly elements.
  - .2 Light standards (light poles, shrouds, arms, electrical fixtures and photo cells).
- .7 Make use of items supplied by Owner before fabricating new stock.
- .8 Salvage and reuse all site furnishings and fixtures which are identified to be relocated on the site. The Consultant shall approve condition of all salvaged site furnishings and fixtures.

**1.10 CONSTRUCTION PROGRESS SCHEDULE**

- .1 Meet with Owner and Consultant within five (5) working days of Contract award, to discuss proposed approach for undertaking the Work, inclusive of methodology, sequencing, Construction Equipment, and labour resources to be utilized.
- .2 Submit a preliminary as-planned schedule as indicated in Section 01 32 16 Construction Progress Schedule, within fifteen (15) working days after Contract award.
  - .1 Indicate proposed phasing plan within preliminary as-planned schedule, for review and approval. Project schedule to constructed during the Pool shut down from September 17 to December 9<sup>th</sup>, 2019
  - .2 Project comprises 2 phases of Work that include, but are not limited to, the following:
    - .1 Phase 1: The new reception area renovation (the old/existing area can remain operating); completed for Occupancy by October 17, 2019.
    - .2 Phase 2: Old reception area can be converted into offices, once the new reception area is open and operating, completed for Occupancy/Substantial completion by December 2, 2019.
- .3 Once preliminary as-planned schedule is approved and the final as-planned schedule is created, record "progress to date" on a copy of schedule to be available at the Site. Inspect Work with the Owner and the Consultant at least bi-weekly to establish progress on each current activity.
- .4 The Contractor's schedule is to be updated and resubmitted to the Consultant as a progress schedule at least once per month, on a date to be mutually agreed by the Contractor and the Consultant

**1.11 SITE PROGRESS RECORDS**

- .1 Maintain at site a permanent written record of progress of work. Make the record available at all times with copies provided when requested. Include in record each day:
  - .1 Weather conditions with maximum and minimum temperatures.
  - .2 Conditions encountered during excavation. Record quantities pumped for dewatering.

- .3 Commencement and completion dates of the work of each trade in each area of Project.
  - .4 Erection and removal dates of formwork in each area of Project.
  - .5 Dates, quantities, and particulars of each concrete pour.
  - .6 Dates, quantities, and particulars of waterproofing installation.
  - .7 Dates, quantities, and particulars of roofing installation.
  - .8 Attendance of Contractor's and Subcontractor's work forces at Project and a record of the work they perform.
  - .9 Dates, status and particulars of submissions, i.e. shop drawings, samples, mock-ups and the like.
  - .10 Dates, status and particulars of deliveries, i.e. manufacturing dates, delivery and installation dates.
  - .11 Visits to site by Owner, Consultant, authorities having jurisdiction, testing companies, Contractor, Subcontractors, and suppliers.
- .2 Maintain a progress chart in approved format. Show on chart proposed work schedule and progress of work by Contractor and Subcontractor. The status of delivery items, i.e. shop drawings status, manufacture dates - delivery and installation dates.

#### **1.12 DOCUMENTS AT THE PLACE OF THE WORK**

- .1 Maintain at the Place of the Work, one copy of each of following:
- .1 Contract Documents including drawings, specifications, addenda, and other modifications to the Contract, including copies of standards and codes referenced in the Contract Documents.
  - .2 'Reviewed' or 'Reviewed as Modified' shop drawings. Refer to Section 01 33 00 for details of schedules required.
  - .3 Construction, inspection and testing, and submittal schedules.
  - .4 Supplemental Instructions, proposed Change Orders, Change Orders, and Change Directives.
  - .5 Field Test Reports.
  - .6 Consultant's field review reports and deficiency reports.
  - .7 Reports by authorities having jurisdiction.
  - .8 Building and other applicable permits, and related permit documents.
  - .9 Daily log of the Work.
  - .10 As-built drawings recording as-built conditions, instructions, changes, and the like, as called for in Section 01 33 00, prior to being concealed.
- .2 Make above material available to Consultant upon request.

#### **1.13 TRADEMARK AND LABELS**

- .1 Trademarks and labels, including applied labels, shall not be visible in finished work in finished areas, unless otherwise accepted or indicated by Consultant.

#### **1.14 EXAMINATION**

- .1 Examine site, and ensure that each Section performing work related to site conditions has examined it, so that all are fully informed on all particulars which affect the Project Work (thereon and at the place of the building, and in order that construction proceeds competently and expeditiously).



- .2 Ensure by examination that all physical features at the work, and working restrictions and limitations which exist are known, so that the Owner is not restricted in his use of the premises for his needs.
- .3 Previously Completed Work:
  - .1 Where dimensions are required for proper fabrication, verify dimensions of completed work in place before fabrication and installation of work to be incorporated with it.
  - .2 Verify that previously executed work and surfaces are satisfactory for installation or application, or both, and that performance of subsequent work will not be adversely affected.
  - .3 Ensure that work installed in an unsatisfactory manner is rectified by those responsible for its installation before further work proceeds.
  - .4 Commencement of work will constitute acceptance of site conditions and previously executed work as satisfactory.
  - .5 Defective work resulting from application to, or installation on, or incorporation with, unsatisfactory previous work will be considered the responsibility of those performing the later work.
- .4 Construction Measurements:
  - .1 Take site dimensions of completed work before installation of work to be incorporated commences.
  - .2 Before commencing installation of work, verify that its layout is accurately in accordance with intent of Drawings, and that positions, levels, and clearances to adjacent work are maintained.
  - .3 Before commencing work, verify that all clearances required by authorities having jurisdiction can be maintained.
  - .4 If work is installed in wrong location, rectify it before construction continues.
  - .5 Where dimensions are not available before fabrication commences, the dimensions required shall be agreed upon between the trades concerned.
  - .6 All measurements shall be Imperial.

#### **1.15 PROTECTION OF WORK, PROPERTY AND PERSONS**

- .1 Include in work necessary methods, materials, and construction to ensure that no damage or harm to work, materials, property and persons results from the work of this Contract. Temporary facilities relating to protection are specified in Section 01 50 00.
- .2 Comply with all instructions and/or orders issued by authorities having jurisdiction.
- .3 Ensure that compulsory wearing of hard hats and safety boots is observed by all persons employed on the work. Provide spare hard hats for visitors, refuse admission to the premises to those refusing to wear same.
- .4 Keep excavations, and pits free of rainwater, ground water, backing up of drains and sewers, and all other water. Pump dry as required.
- .5 Protect adjacent private and public property from damage and, if damaged, make good immediately. Make good private property to match in all details its original condition in material and finishes as approved, and public property in accordance with requirements specified and/or instructed by its Owner or as directed by the Consultant.
- .6 Keep surfaces, on which finish materials will be applied, free from grease, oil, and other contamination which would be detrimental in any way to the application of finish materials.
- .7 Do not apply visible markings to surfaces exposed to view in finished state or that receive transparent finishes.

- .8 Protect surfaces of completed work exposed to view from staining, disfigurement and all other damage by restriction of access or by use of physical means suitable to the material and surface location. Establish with each Subcontractor the suitability of such protection in each case.
- .9 Brace and shore masonry walls until their designed lateral support is incorporated at both top and bottom, in accordance with safe construction practices.
- .10 Enforce fire prevention methods at site for new work maintain existing in accordance with local authorities having jurisdiction. Do not permit bonfires, open flame heating devices or accumulation of debris. Use flammable materials only if proper safety precautions are taken, both in use and storage.
- .11 Do not store flammable materials in the building. Take necessary measures to prevent spontaneous combustion. Place cloths and other disposable materials that are a fire hazard in closed metal containers and remove them from the building every night.
- .12 Where flammable materials are being applied, ensure that adequate ventilation is provided, spark-proof equipment is used, and smoking and open flames are prohibited.
- .13 Ensure that volatile fluid wastes are not disposed of in storm or sanitary sewers or in open drain courses.
- .14 Public Utilities and Services:
  - .1 Verify location of and limitations imposed by, existing mechanical, electrical, telephone and similar services, and protect them from damage. If necessary, relocate active services to ensure that they function continuously wherever possible in safety and without risk of damage or down time to the existing buildings.
  - .2 Cap off and remove unused utility services encountered during work after approval is given by the utilities concerned or authorities having jurisdiction, which ever may apply. Relocation, removal, protection and capping of existing utility services shall be performed only by the applicable utility, and of other services by licensed mechanics.
  - .3 Make arrangements and pay for connection charges for services required for the Work.
- .15 Ensure that precautions are taken to prevent leakage and spillage from plumbing and mechanical work that may damage surfaces and materials finished or unfinished.
- .16 Give constant close supervision to roofing/waterproofing membranes following their installation, during the time they are temporarily protected or exposed, to ensure that no damage occurs to them before completion of building.
- .17 Prevent spread of dust beyond the construction site by wetting, or by other approved means, as required or as directed by the Consultant and/or authorities having jurisdiction.
- .18 Make good roads, soft landscaping, walkways, curbs, sidewalks, possessions and property, soiled or damaged due to the Work, to requirements of authorities having jurisdiction and requirements of and Making Good, as applicable.

#### **1.16 WORK ON PUBLIC PROPERTY**

- .1 Include curb cuts and making good of existing property to Provide fully paved and finished approaches to requirements of authorities having jurisdiction.
- .2 Include making good of existing curbs, walks, paving and soft landscaping on adjacent property.

#### **1.17 INSERTS, ANCHORS AND FASTENINGS**

- .1 Include in the work of each Section necessary fastenings, anchors, inserts, attachment accessories, and adhesives. Where installation of devices is in work of other Sections, deliver devices in ample time for installation, locate devices for other Sections and co-operate with other Sections as they require.
- .2 Do not install wood plugs or blocking for fastenings in masonry, concrete, or metal construction, unless specified or indicated on the drawings.

- .3 Do not use fastenings which cause spalling or cracking of materials in which they are installed. Do not use powder actuated fastening devices unless specified or prior written approval is given by the Consultant for each specific use.
- .4 Use only approved driven fasteners.
- .5 Install metal-to-metal fastenings fabricated of the same metal or of a metal which will not set up electrolytic action causing damage to fastenings or components, or both. Use non-corrosive or galvanized steel fastenings for exterior work, and where attached to, or contained within, exterior walls and slabs. Leave steel anchors bare where cast in concrete.
- .6 Install work with fastenings or adhesives in sufficient quantity to ensure permanent secure anchorage of materials, components, and equipment. Space anchors within limits of load-bearing or shear capacity.
- .7 Space exposed fastenings evenly and in an organized pattern. Keep number to a minimum. Provide exposed metal fastenings of same material, texture, colour and finish as metal on which they occur.
- .8 At fastenings that penetrate metal roof deck, ensure that penetrations are sealed airtight with approved sealant.
- .9 Galvanize steel anchors in masonry and at exterior of building, unless otherwise specified elsewhere. Leave steel anchors bare where cast in concrete.

#### **1.18 SMOG ALERT PROTOCOLS**

- .1 The Contractor shall develop and implement a set of smog alert protocols for use in the Work.
- .2 The Contractor's smog alert protocols shall complement the smog alert response plan already in place for City of Toronto operations.

#### **1.19 CLEANING**

- .1 Ensure that spatters, droppings, soil, labels, and debris are removed from surfaces to receive finishes, before they set up. Leave work and adjacent finished work in new condition.
- .2 Use only cleaning materials which are recommended for the intended purpose by both the manufacturer of the surface to be cleaned and by the cleaning material supplier.
- .3 Maintain areas "broom clean" at all times during the work. Vacuum clean interior areas immediately before finish painting commences.
- .4 Do not burn or bury waste material at site. Remove as often as required to avoid accumulation.
- .5 Do not allow waste material and debris to accumulate in an unsightly or hazardous manner. Sprinkle dusty accumulations with water or other approved materials during removal of same.
- .6 Control lowering of materials. Use as few handlings as possible. Do not drop or throw materials from storeys above grade.
- .7 Ensure that cleaning operations are scheduled to avoid deposit of dust or other foreign matter or surfaces during finishing work and until wet or tacky surfaces are cured.
- .8 Each Section shall supply the Contractor with instructions for final cleaning of his work, and for inclusion in Project Data Book as specified in each trade Section and in Section 01 33 00.
- .9 Contractor shall perform final cleaning one (1) week prior to opening the project to the public and shall include cleaning of all work as required by each trade. Co-ordinate final cleaning with Owner's maintenance staff.

#### **1.20 ADJUSTING**

- .1 Ensure that all parts of work fit snugly, accurately and in true planes, and that moving parts operate positively and freely, without binding and scraping.
- .2 Verify that work functions properly, and adjust it accordingly to ensure satisfactory operation.
- .3 Lubricate products as recommended by the supplier.

**1.21 SALVAGE**

- .1 Unless otherwise specified, surplus material resulting from construction, and construction debris shall become the property of Contractor, who shall dispose of it away from site.
- .2 Treasure, such as coins, bills, papers of value, and articles of antiquity, discovered during digging, demolition and cutting at the site shall remain property of Owner, and shall be delivered immediately into his custody.

**1.22 SIGNAGE**

- .1 All site signage prior to fabrication or installation shall have written approval by the Owner.
- .2 The Contractor shall submit to the owner a layout of all required signage, show types, sizes and locations.

**1.23 PREMIUM TIME**

- .1 Each sub-contractor shall be aware and shall take into consideration that any work which will cause disruption to the daily operation of the Community Centre will have to be done after normal operating hours of the Community Centre. Co-ordinate with Contractor.

2 Products

**Not Used**

3 Execution

**Not Used**

**END OF SECTION**

1 General

1.1 GENERAL

- .1 Prices included in the Contract shall be complete for the applicable work, and shall constitute the full consideration, payment, compensation and remuneration to the Contractor for all such work. For greater certainty, but without limitation to the foregoing, such prices shall constitute full and complete consideration, payment, compensation and remuneration to the Contractor for the following (subject to adjustment only as specified in the Contract Documents):
  - .1 Expenditures for wages and for salaries of workmen, engineers, superintendents, draftsmen, foremen, timekeepers, accountants, expeditors, clerks, watchmen and such other personnel as may be approved, employed directly under the Contractor and while engaged on the applicable work at the site and expenditures for travelling and board allowances of such employees when required by location of the applicable work or when covered by trade agreements and when approved; provided, however, that nothing shall be included for wages or salary of the Contractor if an individual, or of any member of the Contractor's firm if the Contractor is a firm or the salary of any officer of the Corporation if the Contractor is a corporation, unless otherwise agreed to in writing;
  - .2 Expenditures for material used in or required in connection with the construction of the applicable work including material tests and mix designed required by the laws or ordinances of any authority having jurisdiction and not included under Subparagraph .9.
  - .3 Expenditures for preparation, inspection, delivery, installation and removal of materials, plant, tools and supplies;
  - .4 Temporary facilities as required for the applicable work;
  - .5 Travelling expenses properly incurred by the Contractor in connection with the inspection and supervision of the applicable work or in connection with the inspection of materials prepared or in course of preparation for the applicable work and in expediting their delivery;
  - .6 Rentals of all equipment whether rented from the Contractor or others, in accordance with approved rental agreements including any approved applicable insurance premiums thereon and expenditures for transportation to and from the site of such equipment, costs of loading and unloading, cost of installation, dismantling and removal thereof and repairs or replacements during its use on the applicable work, exclusive of any repairs which may be necessary because of defects in the equipment when brought to the work or appearing within thirty (30) days thereafter;
  - .7 The cost of all expendable materials, supplies, light, power, heat, water and tools (other than tools customarily provided by tradesmen) less the salvage value thereof at the completion of the applicable work;
  - .8 Assessments under the Workplace Safety Insurance Act, the Unemployment Insurance Act, Canada Pension Act, statutes pay or any similar statutes; or payments on account usual vacations made by the contractor to his employees engaged on the applicable work at the site to the extent to which such assessments or payments for vacations with pay relate to the work covered by the specified price; and all sales taxes or other taxes where applicable;
  - .9 The amounts of all Subcontracts related to the specified price;
  - .10 Premiums on all insurance policies and bonds called for under this Contract as related to the specified price;
  - .11 Royalties for the use of any patented invention on the applicable work;
  - .12 Fees for licences and permits in connection with the applicable work;
  - .13 Duties and taxes imposed on the applicable work; and

.14 Such other expenditures in connection with the applicable work as may be approved; provided always that except with the consent of the Owner, the above items of cost shall be at rates comparable with those prevailing in the locality of the work.

2 Products

**Not Used**

3 Execution

**Not Used**

**END OF SECTION**

1 General

**1.1 CASH ALLOWANCES**

- .1 Expend cash allowances only on Consultant's / Owner's written instructions.
- .2 Cash allowances specified in various Sections shall be carried and administered by the Contractor. Cash allowance shall not be included by a Subcontractor in the amount for their subcontract work.
- .3 Exclude in each expenditure from cash allowances applicable taxes, as specified in Section 00 41 00 Bid Form and GC 4.1 Cash Allowances. Applicable taxes shall be identified separately on the Bid Form and added to the Contract Price for Total Price of the Contract.
- .4 The Contract Price, and not the cash allowances, includes the Contractor's overhead and profit in connection with such cash allowances.
- .5 Where a cash allowance is for work performed under a subcontract, the Contractor shall tender the work involved and submit the tenders received, with the Contractor's recommendations, for approval.
- .6 Submit, before application for final payment, copies of all invoices and statements from suppliers and Subcontractors for work which has been paid for from cash allowances.
- .7 Include in the Contract Price identified on the Bid Form, a total Cash Allowance of \$16,500 for the following items in the amount of:
  - .1 Decommissioning of redundant electrical and mechanical services,  
as indicated in Section 02 41 19 Selective Demolition - \$10,000.00
  - .2 Door Hardware - \$6,500

2 Products

**Not Used**

3 Execution

**Not Used**

**END OF SECTION**

1 General

**1.1 APPROVED ALTERNATES AND APPROVED EQUIVALENT**

- .1 Named Products alternates or equals, indicated by the phrases "or approved alternate by XYZ Manufacturing" or "or approved equal by XYZ Manufacturing", shall be interpreted to mean that named Product alternate or equal, if selected for use in lieu of indicated or specified Product, meets or exceeds performance, appearance, general arrangement, dimensions, availability, code and standards compliance, and colour of specified Product.
- .2 Be responsible for costs and modifications associated with the inclusion of named Product alternate or equal at no additional cost to the Owner.
- .3 The process for proposing and approving alternates or equals, including alternate design solutions, shall be the same process as for proposing and approving substitutions (refer to paragraph 1.2 below).
- .4 Confirm delivery of specified items prior to proposing alternates or equals.

**1.2 SUBSTITUTIONS**

- .1 Submission of substitutions:
  - .1 Proposals for substitutions of Products and materials must be submitted in accordance with procedures specified in this section.
  - .2 Consultant may review submissions, if directed by Owner, but in any case with the understanding that the Contract Time will not be altered due to the time required by the Consultant to review the submission and by the Contractor to implement the substitution in the Work.
- .2 Submission requirements:
  - .1 Description of proposed substitution, including detailed comparative specification of proposed substitution with the specified Product.
  - .2 Manufacturer's Product data sheets for proposed Products.
  - .3 Respective costs of items originally specified and the proposed substitution.
  - .4 Confirmation of proposed substitution delivery, in writing by Product manufacturer.
  - .5 Compliance with the building codes and requirements of authorities having jurisdiction.
  - .6 Affect concerning compatibility and interface with adjacent building materials and components.
  - .7 Compliance with the intent of the Contract Documents.
  - .8 Effect on Contract Time.
  - .9 Reasons for the request.
- .3 Substitutions submitted on shop drawings without following requirements of this section prior to submission of the affected shop drawings will cause the shop drawings to be rejected.
- .4 Proposed substitutions shall include costs associated with modifications necessary to other adjacent and connecting portions of the Work.
- .5 Consultant's decision concerning acceptance or rejection of proposed substitutions is final. Should it appear to the Consultant that the value of services required to evaluate the substitution exceeds the potential reduction, the Consultant will advise the Owner that the substitution does not merit consideration before proceeding with a full evaluation. If the substitution will produce a reduction commensurate with or exceeding the value of the Consultant's services to evaluate the substitution, the Consultant will request the Owner's direction to proceed with evaluation.



2 Products

**Not Used**

3 Execution

**Not Used**

**END OF SECTION**

1 General

**1.1 REQUEST FOR INTERPRETATION - RFI**

- .1 A request for interpretation (RFI) is a formal process used during the Work to obtain an interpretation of the Contract Documents.
- .2 Submittal procedures:
  - .1 RFI form:
    - .1 Submit RFI on "Request for Interpretation" form, appended to this section. The Consultant shall not respond to an RFI except as submitted on this form.
    - .2 Where RFI form does not provide sufficient space for complete information to be provided thereon, attach additional sheets as required.
    - .3 Submit with RFI form necessary supporting documentation.
  - .2 RFI log:
    - .1 Maintain log of RFIs sent to and responses received from the Consultant, complete with corresponding dates.
    - .2 Submit updated log of RFIs with each progress draw submittal.
  - .3 Submit RFIs sufficiently in advance of affected parts of the Work so as not to cause delay in the performance of the Work. Costs resulting from failure to do this will not be paid by the Owner.
  - .4 RFIs shall be submitted only to the Consultant.
  - .5 RFIs shall be submitted only by Contractor. RFIs submitted by Subcontractors or Suppliers shall not be accepted.
  - .6 Number RFIs consecutively in one sequence in order submitted.
  - .7 Submit one distinct RFI per RFI form.
  - .8 Consultant shall review RFIs from the Contractor submitted in accordance with this section, with the following understandings:
    - .1 Consultant's response shall not be considered as a Change Order or Change Directive, nor does it authorize changes in the Contract Price or Contract Time or changes in the Work.
    - .2 Only the Consultant shall respond to RFIs. Responses to RFIs received from entities other than the Consultant shall not be considered.
  - .9 Allow ten (10) Working Days for review of each RFI by the Consultant.
    - .1 Consultant's review of RFI commences on date of receipt by the Consultant of RFI submittal and extends to date RFI returned by Consultant.
    - .2 When the RFI submittal is received by Consultant before noon, review period commences that day; when RFI submittal is received by Consultant after noon, review period begins on the next Working Day.
  - .10 Contractor shall satisfy itself that an RFI is warranted by undertaking a thorough review of the Contract Documents to determine that the claim, dispute, or other matters in question relating to the performance of the Work or the interpretation of the Contract Documents cannot be resolved by direct reference to the Contract Documents. Contractor shall describe in detail this review on the RFI form as part of the RFI submission. RFI submittals that lack such detailed review description, or where the detail provided is, in the opinion of the Consultant, insufficient, shall not be reviewed by the Consultant and shall be rejected.

2 Products

**Not Used**

3 Execution

**Not Used**



1 General

**1.1 CHANGES IN THE WORK**

- .1 The following shall govern changes in the work.
- .2 Written instructions, with or without revised Drawings, or drawings additional to the Contract Documents, or both will be issued to the Contractor for proposed changes in the work. The written instructions will indicate whether the changes in the work are to be performed immediately or after the cost of changes is agreed upon. Work which is to proceed immediately shall have a mutual agreed to budget figure where applicable.
- .3 The Contractor shall submit his quotation within ten (10) working days with full documentation for the changes in a detailed breakdown as determined by the Consultant as will allow the Consultant to ascertain the accuracy of amounts involved.
- .4 The Contractor shall review all cost submissions to ensure their accuracy and/or conformance to unit costs if applicable prior to submission to the Consultant.
- .5 In the event of a change to the work carried out by the Contractor's own forces plus the total amount for extras will include the cost, plus 10% for the Contractor's supervision, overhead expenses and profit on additional work by his own forces only after all credits for each item included in the change order have been deducted.
- .6 In the event of a change to the work carried out by Subcontractors where the Contractor submits quotations from his Subcontractors, the Consultant reserves the right to call for detailed breakdowns including material invoices and labour time sheets. The Subcontractors will be permitted to add no more than 10% for overhead and profit on additional work only after all credits for each item included in the change orders have been deducted. The Contractor's mark-up for such subtrade work shall be 5%.
  - .1 The Contractor shall inform all his subcontractors of these terms.
- .7 Overhead for changes in the work shall include all indirect costs, but not restricted to, site superintendence, subtrade attendance, plant and equipment, including operators, site offices, storage compounds, cleaning and the like; first aid; timekeeping; security; all temporary services; office administration; processing correspondence, changes, shop drawings and the like; costing and accounting; payroll; technical staff, building permit and statutory fees; insurance and bonds; scheduling.
- .8 Profit for changes in the work is the remuneration to the Contractor and the Subcontractors and is to apply to the sum of the actual cost and overhead.
- .9 Where provided for, unit prices for additions and deletions to the work shall be those as approved by the Owner. Unit prices include all overhead and profit changes.
- .10 Where the Contractor or any Subcontractor proceeds with any change on a time and material basis, daily time sheets and material slips shall be submitted. The application for a final change order must be accompanied by these time sheets, materials slips, and a breakdown.
- .11 Where the Owner and Contractor cannot mutually agree upon the cost or evaluation of a given change, the Contractor, upon receiving written directions from the Owner, shall proceed with the required change without delaying the work and the evaluation of the change will be submitted for arbitration at the completion of the Project.
- .12 Owner and Consultant shall have twenty-one (21) working days in which to review and approve Contractor's quotations for changes to the work.
- .13 The Consultants at time to time may issue job instructions solely for the purposes of clarifying drawings and specifications. As such Contractor shall not be permitted to apply costs against these job instructions.
- .14 In the event of large scope changes, the Contractor and Subcontractors agree to negotiate the unit prices to a lesser amount than those previously tendered.

2 Products

**Not Used**

3 Execution

**Not Used**

**END OF SECTION**

1 General

**1.1 DESCRIPTION**

- .1 Coordination of the work of all Sections of the Specification is the responsibility of the Contractor.
- .2 The Contractor will be deemed to possess the necessary technical skills to carefully evaluate all requirements of the Contract, and to have included in the Price all costs for the proper implementation of these requirements.
- .3 The Contractor's responsibility includes, but is not restricted to, co-ordination specified in this Section, except where otherwise specified.

**1.2 RELATED MECHANICAL AND ELECTRICAL WORK**

- .1 Coordination of the installation of systems specified in Divisions 20 and 26, including the interrelating operation and functioning between components of a system and between systems, is the responsibility of those performing the work of Divisions 20 and 26, with final coordination the responsibility of the Contractor.
- .2 Provide interference drawings as herein specified to ensure proper co-ordination of subtrade work. No extras will be considered for work not properly coordinated prior to installation.
- .3 Ensure that service poles, pipes, conduit, wires, fill-pipes, vents, regulators, meters and similar Project service work is located in inconspicuous locations. If not indicated on Drawings, verify location of service work with Consultant before commencing installation.

**1.3 QUALITY ASSURANCE**

- .1 Requirements of Regulatory Agencies:
  - .1 Coordinate requirements of authorities having jurisdiction.
- .2 Quality Control:
  - .1 Ensure that work meets specified requirements.
  - .2 Schedule, supervise and coordinate inspection and testing as specified in Section 01 45 00.
- .3 Job Records:
  - .1 Maintain job records and ensure that such records are maintained by Subcontractors.

**1.4 SUPERINTENDENCE**

- .1 Provide superintendent and necessary supporting staff personnel who shall be in attendance at the Place of the Work while Work is being performed, with proven experience in erecting, supervising, testing and adjusting projects of comparable nature and complexity.
- .2 The Contractor shall appoint a superintendent at the Place of the Work who shall have overall authority at the Place of the Work and shall speak for the Contractor and represent the Contractor's interest and responsibilities at meetings at the Place of the Work and in dealings with the Consultant and the Owner.
- .3 Supervise, direct, manage and control the work of all forces carrying out the Work, including subcontractors and suppliers. Carry out daily inspections to ensure compliance with the Contract Documents and the maintenance of quality standards. Ensure that the supervisory staff includes personnel competent in supervising all Sections of Work required.
- .4 Arrange for sufficient number of qualified assistants to the supervisor as required for the proper and efficient execution of the Work.

## 1.5 SUBMITTALS

- .1 Provide a complete set of all required Contract Documents, together with instructions for changes to the work which are issued, to each firm preparing shop drawings.
- .2 Schedule and expedite submission of specified submittals.
- .3 Review submittals and make comments as specified in Section 01 33 00.
- .4 Ensure that each original submission, and their subsequent revisions and resubmissions are made on schedule.

## 1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 It is the responsibility of the Contractor to ensure that the supplier or distributor of materials specified or accepted alternatives, which have been bid, has materials on the site when required. The Contractor shall obtain confirmed delivery dates from the supplier, and ensure no delay in the progress of the work
- .2 Provide equipment delivery schedule, coordinated with construction and submittals schedule, showing delivery dates for major and/or critical equipment. Provide delivery access and unloading areas.
- .3 Make available areas for storage of products and construction equipment to meet specified requirements, and to ensure a minimum of interference with progress of the work and relocation.
- .4 Make access available for transference of stored products and construction equipment to work areas.
- .5 The Contractor shall contact the Consultant immediately upon receipt of information indicating that any material or item, will not be available on time, in accordance with the original schedule, and similarly it shall be the responsibility of all subcontractors and suppliers to so inform the Contractor.
- .6 The Consultant reserves the right to receive from the Contractor at any time, upon request, copies of actual purchase or work orders of any material or products to be supplied for the work.
- .7 If materials and products have not been placed on order, the Consultant may instruct such items to be placed on order, if direct communication in writing from the manufacturer or prime suppliers is not available indicating that delivery of said material will be made in sufficient time for the orderly completion of the Work.
- .8 The Consultant's review of purchase orders or other related documentation shall in no way release the Contractor, or his subcontractors and suppliers from their responsibility for ensuring the timely ordering of all materials and items required, including the necessary expediting, to complete the work as scheduled in accordance with the Contract Documents.

## 1.7 JOB CONDITIONS

- .1 Ensure that conditions within the building are maintained and that work proceeds under conditions meeting specified environmental requirements.
- .2 Ensure that protection of adjacent property and the work is adequately provided and maintained to meet specified requirements.

## 1.8 WARRANTIES

- .1 Ensure that warranties are provided, as indicated in Section 01 78 36 Warranties.
- .2 Coordinate warranty conditions of interconnected work to ensure that full coverage is obtained.

## 1.9 CO-ORDINATION

- .1 Review Contract Documents and advise the Consultant of possible conflicts between parts of the work before preparation of shop drawings, ordering of products or commencement of affected work.



- .2 Coordinate and be responsible for layout of all work in each area and work on which subsequent work depends to facilitate mutual progress, and to prevent conflict between parts of the work.
- .3 No addition to the Total Price will be allowed because of interference between the parts of the work of a trade or between the work of different trades unless such interference was brought to the attention of the consultant in writing prior to the start of construction.
- .4 Ensure that each Section makes known, for the information of the Contractor and other Sections, the environmental and surface conditions required for the execution of its work; and that each Section makes known the sequences of others' work required for installation of its work.
- .5 Ensure that each Section, before commencing work, knows requirements for subsequent work and that each Section is assisted in the execution of its preparatory work by Sections whose work depends upon it.
- .6 Ensure that work to be enclosed within ceiling and/or wall spaces can be so accommodates without interference and with other parts of the work.
- .7 Ensure that setting drawings, templates, and all other information necessary for the location and installation of materials, holes, sleeves, inserts, anchors, accessories, fastenings, connections, and access panels are provided by each Section whose work requires cooperative location and installation by other Sections, and that such information is communicated to the applicable installer.
- .8 Deliver materials supplied by one Section to be installed by another well before the installation begins, as per Construction Progress Schedule.
- .9 Sections giving installation information in error, or too late to incorporate in the work, shall be responsible for having additional work done which is thereby made necessary.
- .10 Remove and replace work installed in error which is unsatisfactory for subsequent work.
- .11 Prepare interference and equipment placing drawings to ensure that all components will be properly accommodated within the spaces provided.
- .12 Prepare drawings to indicate coordination and methods of installation of a system with other systems where their relationship is critical. Ensure that all details of equipment apparatus, and connections are coordinated.
- .13 Ensure that clearance required by authorities having jurisdiction and for proper maintenance are indicated on Drawings.
- .14 Distribute coordination drawings well in advance of fabrication and installation of work affected. Place no orders for affected equipment without submission of coordination drawings to the supplier.

#### **1.10 COOPERATION**

- .1 Provide forms, templates, anchors, sleeves, inserts and accessories required to be fixed to or inserted in the Work and set in place or instruct separate Subcontractors as to their location.
- .2 Supply items to be built in, as and when required together with templates, measurements, shop drawings and other related information and assistance.
- .3 Pay the cost of extra work and make up time lost as a result of failure to provide necessary information and items to be built in.

#### **1.11 STRUCTURE ALIGNMENT REPORTS**

- .1 Have a qualified instrument technician check alignment of perimeter slab edge, and alignment of concrete cores as work progresses.
- .2 Check alignment at each floor and submit a written report, under signature of instrument technician and Contractor, stating conditions at that floor, prior to concrete pour of next floor.
- .3 State in reports variations from plumb, from horizontal alignment, and from elevations (level) shown in Contract Documents. Report on variations affecting structural steel connections and connections of components in building envelope.

- .4 Include a listing of data submitted in previous reports.
- .5 Make particular mention in each report to alignment and dimensions of elevator hoist ways, and to exterior faces of core wall construction which will provide substrate for applied finishes in public areas.
- .6 Correct deviations from allowable tolerances as directed by Consultant
- .7 Submit reports to Consultant and to Subcontractors affected by concrete work, including but not limited to Subcontractors for following trades as applicable, structural steel, architectural precast concrete cladding, curtain wall, elevator, plastering and/or gypsum board.

#### **1.12 INTERFERENCE DRAWINGS**

- .1 Installation shall proceed in accordance with final approved interference Drawings. Work carried out without final approved interference Drawings and which does not meet design requirements and specified ceiling heights shall be removed, re-coordinated and re-installed at no cost to Owner.
- .2 Prepare Drawings indicating relationship of new and existing and/or unforeseen conditions at all areas in new construction as well as existing work prior to commencement of work in the area. For construction in existing areas, survey existing conditions. Take into consideration and coordinate these conditions with new work on interference Drawings.
- .3 For all locations, before commencing installation, prepare Drawings showing relationship of, but not limited to: structure, electrical, cable trays, communication system, duct work, conduit, piping, sprinklers, ceiling supports and framing, and communication and specialized equipment located within ceiling and shaft spaces.
- .4 Indicate locations of visible items such as air handling outlets, light fixtures, smoke detectors, sprinkler heads, communication grilles and access panels occurring at these locations. Do not proceed with work until interferences in area are resolved. Do not lower ceiling heights in area without reviewing and receiving approval of Consultant.
- .5 Ensure interference Drawings are initialed by a responsible person of each Subcontractor involved along with Contractor's signature. Submit to Consultant for review and record purposes.
- .6 Be responsible for preparation of interference Drawings and coordinate. Obtain input from all Subcontractors. Assign mechanical and electrical coordinator to lead process of interference Drawings.

#### **1.13 PROJECT RECORD DRAWINGS**

- .1 Record, as the work progresses, work constructed differently than shown on Contract Documents. Record all changes in the work caused by site conditions; by Owner, Consultant, sub-consultants, Contractor, and Subcontractor originated changes; and by site instructions, supplementary instructions, field orders, change orders, addendums, correspondence, and directions of authorities having jurisdiction. Accurately record location of concealed structure, and mechanical and electrical services, piping, valves, conduits, pull boxes, junction boxes and similar work not clearly in view, the position of which is required for maintenance, alteration work, and future additions. Do not conceal critical work until its location has been recorded.
- .2 Dimension location of concealed work in reference to building walls, and elevation in reference to floor elevation. Indicate at which point dimension is taken to concealed work. Dimension all terminations and offsets of runs of concealed work.
- .3 Make records in a neat and legibly printed manner with a non-smudging medium.
- .4 Identify each record drawing as "Project Record Copy". Maintain drawings in good condition and do not use them for construction purposes.
- .5 After completion of the work, purchase a complete set of white prints from the Consultant and transfer the information recorded on the white prints accurately, neatly in red ink with dimensions, as applicable. Return these marked-up as-built white prints plus two additional sets of white prints to the Consultant for his review. Any subsequent changes found by the Consultant shall

remain the responsibility of the contractor and new white prints will be issued for these changes and re-submitted back to the Consultant at no charge to the Owner.

- .6 Maintain Project record drawings in a state current to Project. Such state will be considered a condition precedent for validation of applications for payment. The Consultant's visual inspection will constitute proof that record drawings are current.
- .7 Provide Consultant with accurate red-marked record drawings for their transfer to latest version of AutoCad with application for Certificate of Substantial Performance. Final acceptance of the Work will be predicated on receipt and approval of record drawings.

#### **1.14 DETAIL FINISHING DRAWINGS**

- .1 During the course of the work, the Owner will provide the Contractor with detail drawings showing the interior finishes and furnishings of the building. The Contractor shall read these drawings in conjunction with the Contract Documents. The Contractor shall check the detail drawings against the Contract Documents and shall report any discrepancies to the Consultant.

#### **1.15 CUTTING AND PATCHING**

- .1 Before cutting, drilling, or sleeving structural load-bearing elements, obtain approval of location and methods from the Structural Engineer and the General Contractor.
- .2 Do not endanger work or property by cutting, digging, or similar activities. No Section shall cut or alter the work of another Section unless such cutting or alteration is approved by the latter Section and the General Contractor.
- .3 Cut and drill with true smooth edges and to minimum suitable tolerances.
- .4 Fit construction tightly to ducts, pipes and conduits to stop air movement completely. The Section performing work that penetrates a fire, air, vapour, moisture, thermal or acoustic separation of the building shall pack voids tightly with rock wool, fibreglass or fire stop material as may be required; seal air, vapour and moisture barriers; and caulk joints as may be required to ensure that no air movement through the penetration is possible.
- .5 Cutting, drilling and sleeving of work shall be done only by the Section who has installed it. The Section requiring drilling and sleeving shall inform the Section performing the work of the location and other requirements for drilling and sleeving.
- .6 Replace, and otherwise make good, all damaged work, as identified by the Consultant or Contractor.
- .7 Cutting and Patching for Holes Required by Mechanical and Electrical work:
  - .1 Include under work of Divisions 20 and 26 cutting or provision of holes up to and including 50 square inches and related patching, except as otherwise indicated.
  - .2 Include under work of this Division holes and other openings larger than 50 square inches, and chases, bulkheads, furring and required patching. This Section shall be responsible for determination of work required for holes in excess of 50 square inches.
- .8 This Section shall be responsible for all cutting and patching in addition to that specified for mechanical and electrical work, and shall directly supervise performance of cutting and patching by other Sections.
- .9 Patching or replacement of damaged work shall be done by the Subcontractor under whose work it was originally executed, and at the expense of the Subcontractor who caused the damage.
- .10 Make patches as invisible as possible in final assembly to the approval of the Consultant/Owner. Unacceptable work will be replaced at no charge to the Owner.

2 Products

**Not Used**

3 Execution

**Not Used**

**END OF SECTION**

1 General

**1.1 ADMINISTRATIVE**

- .1 Schedule and administer meetings every 2 weeks (or more frequently as required) with the Consultant throughout the progress of the Work. Schedules to be updated with the Consultant every 2 weeks for distribution at each meeting.
- .2 Prepare agenda for such meetings.
- .3 The Contractor shall chair such meetings. The Contractor shall administer such meetings and prepare minutes within three (3) days after the meeting date for distribution to the Owner and the Consultant.
- .4 Distribute written notice of each meeting four (4) days in advance of meeting date to the Consultant and the Owner and other affected parties.
- .5 Representatives of parties attending meetings shall be authorized to act on behalf of the parties they represent. Subcontractors and Suppliers do not attend meetings unless authorized by the Consultant and the Owner.
- .6 Prepare and distribute monthly progress reports in accordance with Section 01 32 16, and containing updated schedules, construction photos in accordance with Section 01 33 00, shop drawing logs, requests for interpretation logs, submittals and budget.

**1.2 CONTRACT START-UP MEETING**

- .1 Within five (5) days after award of Contract, request a meeting of parties in Contract to discuss and resolve administrative procedures and responsibilities prior to the commencement of the Work.
- .2 The Owner, the Consultant, the Contractor, site superintendent(s), inspection and testing company, and authorities having jurisdiction, as applicable and at their discretion, will be in attendance.
- .3 Agenda to include the following:
  - .1 Appointment of official representative of participants in the Project.
  - .2 Status of permits, fees and requirement of authorities having jurisdiction. Action required.
  - .3 Review of standard project forms.
  - .4 Requirements for Contract modification and interpretation procedures, including, but not limited to: requests for interpretation, proposed Change Orders, Change Orders, Change Directives, Supplemental Instructions, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
  - .5 Requirements for notification for reviews. Allow a minimum of two (2) Working Days notice to Consultant for review of the Work.
  - .6 Review of schedules and scheduling procedures and requirements in accordance with Section 01 32 16.
  - .7 Appointment of inspection and testing agencies or firms, Section 01 45 00.
  - .8 Requirements for temporary facilities, signs, offices, storage sheds, utilities; Section 01 50 00.
  - .9 Security requirements at and for the Place of the Work, Section 01 50 00.
  - .10 Record drawings, Section 01 33 00.
  - .11 Maintenance manuals, Section 01 33 00.
  - .12 Take-over procedures, acceptance, Section 01 77 19.
  - .13 Warranties, Section 01 78 36.

- .14 Progress claims, administrative procedures, holdbacks.
- .15 Insurances, transcripts of policies.
- .16 Contractor's safety procedures.
- .17 Cleaning/staging area for vehicles.
- .18 Workplace Safety and Insurance Board Certificate.
- .4 The Consultant shall organize and chair the contract start-up meeting. Consultant shall record minutes of the contract start-up meeting and distribute a copy to each participant within ten (10) days of meeting.

### 1.3 PRE-INSTALLATION MEETINGS

- .1 During the course of the Work prior to Substantial Performance of the Work, schedule pre-installation meetings as required by the Contract Documents and coordinated with the Consultant.
- .2 As far as possible, pre-installation meetings shall be scheduled to take place on the same day as regularly scheduled progress meetings.
- .3 Agenda to include the following:
  - .1 Appointment of official representatives of participants in the Project.
  - .2 Review of existing conditions and affected work, and testing thereof as required.
  - .3 Review of installation procedures and requirements.
  - .4 Review of environmental and site condition requirements.
  - .5 Review of schedules and scheduling procedures and requirements of the applicable portions of the Work in accordance with Section 01 32 16, in particular:
    - .1 Schedule of submission of samples, mock-ups, and items for Consultant's consideration.
    - .2 Delivery schedule of specified equipment.
    - .3 Requirements for notification for reviews. Allow a minimum of two (2) Working Days notice to Consultant for review of the Work.
  - .6 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences, Section 01 50 00.
  - .7 Requirements for inspections and tests, as applicable.
    - .1 Schedule and undertake inspections and tests in accordance with Sections 01 32 16 and 01 45 00.
  - .8 Special safety requirements and procedures.
- .4 The following shall be in attendance:
  - .1 Contractor.
  - .2 Subcontractors affected by the work for which the pre-installation meeting is being conducted.
  - .3 Consultant.
  - .4 Manufacturer's representatives, as applicable.
  - .5 Inspection and testing company, as applicable.

### 1.4 PROGRESS MEETINGS

- .1 During the course of the Work prior to Substantial Performance of the Work, schedule progress meetings as directed by the Consultant.

- .2 In advance of progress meetings, Contractor shall submit to the Consultant a two week look ahead schedule of items of work to be undertaken in the two weeks subsequent to the progress meeting. Two week look ahead schedule will be reviewed at the meeting and recorded in the minutes of the meeting. Refer to Section 01 32 16 for requirements for look ahead schedule.
- .3 Attendees at progress meetings shall include the following:
  - .1 Contractor.
  - .2 Contractor's site superintendent(s).
  - .3 Consultant.
  - .4 Owner.
- .4 Agenda to include the following:
  - .1 Review, approval of proceedings of previous meeting.
  - .2 Review of items arising from proceedings.
  - .3 Review of progress of the Work since previous meetings.
  - .4 Review of schedules in accordance with Section 01 32 16, including:
    - .1 Revisions to construction schedule.
    - .2 Progress and schedule for subsequent period of the Work: Two (2) week look-ahead.
    - .3 Problems that impede compliance with construction schedule.
    - .4 Review of off-site fabrication delivery schedules.
    - .5 Review of material delivery dates/schedule.
    - .6 Corrective measures and procedures to regain construction schedule.
    - .7 Review of submittal schedules: expedite as required.
  - .5 Field observations, problems, conflicts.
  - .6 Review status of submittals.
  - .7 Maintenance of quality standards.
  - .8 Pending changes and substitutions.
  - .9 Review of Contract modifications and interpretations including, but not limited to: requests for interpretation and log, proposed Change Orders, Change Orders, Change Directives, Supplemental Instructions, for effect on construction schedule and on Contract Time.
  - .10 Review of status of as-built documents.
  - .11 Other business.

#### **1.5 PRE-TAKEOVER MEETING**

- .1 Prior to application for Substantial Performance of the Work, schedule a pre-takeover meeting.
- .2 Agenda to include the following:
  - .1 Review, approval of proceedings of previous meeting.
  - .2 Review of items arising from proceedings.
  - .3 Review of procedures for Substantial Performance of the Work, completion of the Contract, and handover of the Work.
  - .4 Field observations, problems, conflicts.

- .5 Review of outstanding Contract modifications and interpretations including, but not limited to: requests for interpretation and log, proposed Change Orders, Change Orders, Change Directives, Supplemental Instructions, for effect on construction schedule and on Contract Time.
- .6 Problems which impede Substantial Performance of the Work.
- .7 Review of procedures for deficiency review. Corrective measures required.
- .8 Progress, schedule, during succeeding period of the Work.
- .9 Review submittal requirements for warranties, manuals, and all demonstrations and documentation required for Substantial Performance of the Work.
- .10 Review of status of as-built documents and record drawings.
- .11 Other business.

**1.6 POST-CONSTRUCTION MEETING**

- .1 Prior to application for completion of Contract, schedule a post-construction meeting. Four days prior to date for meeting, Consultant shall confirm a date for meeting based on evaluation of completion requirements.
- .2 Agenda to include the following:
  - .1 Review, approval of proceedings of previous meeting.
  - .2 Confirmation that no business is arising from proceedings.
  - .3 Confirmation of completion of the Contract, and handover of reviewed documentation from the Consultant to the Owner.
  - .4 Confirmation of completion of proposed Change Orders, Change Orders, Change Directives, and Supplemental Instructions.
  - .5 Problems that impede Contract completion.
  - .6 Identify unresolved issues or potential warranty problems.
  - .7 Confirmation of completion of deficiencies.
  - .8 Corrective measures required.
  - .9 Confirm submittal requirements for warranties, manuals, and demonstrations and documentation for Contract completion are in order.
  - .10 Review of procedures for communication during post-construction period.
  - .11 Handover of reviewed record documents by the Consultant to the Owner.
  - .12 Handover of Contract completion insurance policy transcripts by Contractor.
  - .13 Submission of final application for payment.
  - .14 Review and finalize outstanding claims, pricing, and allowance amounts.
  - .15 Status of commissioning and training.
  - .16 Demobilization and the Place of the Work restoration.

2 Products

**Not Used**

3 Execution

**Not Used**

**END OF SECTION**



1 General

**1.1 PLANNING, SCHEDULING AND MONITORING - GENERAL**

- .1 This section includes requirements for the preparation, monitoring and revision of construction schedules.
- .2 The purpose of the schedules and reports mandated in this section is to:
  - .1 Ensure adequate planning and execution of the Work by the Contractor;
  - .2 Establish the standard against which satisfactory completion of the project will be judged;
  - .3 Assist the Owner and the Consultant in monitoring progress;
  - .4 Assess the impact of changes to the Work.
- .3 The Contractor has the obligation and responsibility at all times to plan and monitor all of its activities, anticipating and scheduling its staff, materials, plant and work methods in a manner that is likely to ensure completion of the Work in accordance with the terms and conditions of the Contract and at a rate that will allow the Work to be completed on time.

**1.2 CPM SCHEDULING REQUIREMENTS**

- .1 The schedules required by this section shall take the form of time-scaled diagrams prepared using a computerized scheduling system, capable of producing resource-and/or cost-loaded Critical Path Method (CPM) schedules.
- .2 General requirements applicable to all schedules include the ability to:
  - .1 Easily summarize, group, sort and filter activities by area, phase or other categorization as applicable, or any combination thereof;
  - .2 Electronically compare any given schedule with any previous or subsequent update;
  - .3 Generate monthly progress claims and cash flow projections through resource and cost loading activities;
  - .4 Show schedules in bar chart, network diagram and time scaled logic diagram formats;
  - .5 Apply different calendars to applicable activities; and
  - .6 Transmit schedules electronically via e-mail attachments.
- .3 Provide level of detail for project activities such that sequence and interdependency of Contract tasks are demonstrated and allow coordination and control of project activities. Show continuous flow from left to right.
- .4 Float is defined as the amount of time between the earliest start date and the latest start date of an activity or chain of activities on the CPM schedule. 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 Contract Time to form "Critical Path".
- .5 Use of float suppression techniques such as software constraints, preferential sequencing, special lead/lag logic restraints, extended activity times, or imposed dates, other than as required by the Contract, shall be cause for the rejection of any schedule submitted by the Contractor.

**1.3 SUBMITTALS**

- .1 Make submittals in accordance with Section 01 33 00.
- .2 Schedules shall be submitted to the Consultant in both hard copy and electronic forms. Electronic schedule submissions shall be in an original scheduling software data file type that permits modification of the layouts and data. In case of a discrepancy between an electronic copy of the schedule and the corresponding hard-copy schedule, the hard copy of the schedule that has been formally submitted and reviewed in accordance with the requirements of Section 01 33 00 shall govern.

- .3 Include costs for execution, preparation and reproduction of schedule submittals in tendered price.
- .4 Submission of the schedules referred to in this Section shall constitute the Contractor's representation that:
  - .1 Contractor and its Sub-Contractors intend to execute the Work in the sequence indicated on such schedule;
  - .2 Contractor has distributed the proposed schedule to its Sub-Contractors for their review and comment, and has obtained their concurrence;
  - .3 All elements of the Work required for the performance of the Contract are included. Failure to include any such element shall not excuse the Contractor from completing the Work within the Contract Time and within any other constraints specified in the Contract;
  - .4 Seasonal weather conditions have been considered and included in the planning and scheduling of the Work influenced by high and low ambient temperatures and/or precipitation;
  - .5 Contractor has thoroughly inspected the Site and has incorporated any other special conditions in planning the Work such as specified or required non-work periods, etc.
- .5 Cash flow diagram:
  - .1 Contractor shall submit an updated cash flow diagram quarterly.
  - .2 Cash flow diagram shall be in format acceptable to the Owner.
  - .3 Cash flow diagram shall represent Contractor's anticipated invoicing.

#### **1.4 QUALITY ASSURANCE**

- .1 Use experienced personnel, fully qualified in planning and scheduling to provide services from the commencement of the Work through to the issuance of the Completion Payment Certificate.

#### **1.5 PRELIMINARY AS-PLANNED SCHEDULE**

- .1 Meet with Owner and Consultant within five (5) working days of Contract award, to discuss proposed approach for undertaking the Work, inclusive of methodology, sequencing, Construction Equipment, and labour resources to be utilized.
- .2 Prepare a detailed CPM schedule (the preliminary as-planned schedule), illustrating the Contractor's plan for executing the Work, indicating the times for starting and completing the various stages of the Work and any applicable constraints. The preliminary as planned schedule should refine and amplify the Contractor's tender schedule and must provide sufficient detail of the critical events and their interrelationship to demonstrate that the Work will be performed within the Contract Time.
- .3 The preliminary as-planned schedule shall cover all phases of the Work, and shall represent a practical plan to complete the Work, considering restrictions of access and availability of Work areas, and availability and use of manpower, materials and equipment. The preliminary as-planned schedule shall show the activity duration, sequencing and interdependencies for the following:
  - .1 Preparation of Shop Drawings and material samples;
  - .2 Review and approval of Shop Drawings and material samples;
  - .3 Permitting;
  - .4 Material procurement;
  - .5 Fabrication;
  - .6 Temporary works;
  - .7 Installation;

- .8 Inspection/testing; and
- .9 Handover.
- .4 Each activity shall be coded by the performing entity such as a particular Sub-Contractor, supplier, the Consultant, etc.
- .5 The activities defined in the preliminary as-planned schedule shall represent the planned durations in anticipation of normal manpower and equipment utilization in durations of whole working days. Except for non-construction activities, such as procurement, delivery or submittals, no activity durations shall exceed fifteen (15) working days unless approved by the Consultant. The durations shall be determined based upon resource planning under contractually-defined on-site work conditions. In calculating activity durations, normal inclement weather shall be considered. The Contractor shall schedule the Work to minimize the effect of adverse weather, and to allow for protection of the Site from such effects.
- .6 The total number of activities and the distribution of activities shall reflect the complexity of the Work and shall be finite, measurable, identify a specific function and identify a trade responsible for its completion.
- .7 Prepare a narrative to accompany the preliminary as-planned schedule that provides a detailed description of the labour, materials, plant, means and methods that the Contractor intends to utilize in carrying out the Work to achieve the planned rates of production required to support the activity durations shown in the schedule. The narrative shall also provide explanations supporting the use of lead-lag relationships and, where permitted, constrained dates.

#### **1.6 PRELIMINARY AS-PLANNED SCHEDULE SUBMISSION AND REVIEW**

- .1 Within fifteen (15) working days after Contract award, submit to the Consultant:
  - .1 One (1) electronic copy of the preliminary as-planned schedule, clearly labelled with data date, specific update, and person responsible for update.
  - .2 Two (2) hard copies of bar chart identifying coding, activity durations, early/late and start/finish dates, total float, completion as percentile, current status and budget amounts.
  - .3 Two (2) hard copies of network diagram showing coding, activity sequencing (logic), total float, early/late dates, current status and durations.
  - .4 Two (2) hard copies of written narrative as described in paragraph 1.5.7 above.
- .2 The Owner and the Consultant will review and return the preliminary as-planned schedule within five (5) working days after receipt.
- .3 The preliminary as-planned schedule must be acceptable in principle to the Owner and the Consultant, prior to the release of the first progress payment.

#### **1.7 FINAL AS-PLANNED SCHEDULE AND CASH FLOW**

- .1 The Contractor shall submit all revisions and/or additional information requested by the Owner or the Consultant pursuant to their review of the preliminary as-planned schedule if the Consultant considers that these additions are necessary for the preliminary as-planned schedule to comply with the requirements of this section. The required revisions must be made and the as-planned schedule finalized to the satisfaction of the Owner and the Consultant (whereupon it will become the final as-planned schedule, against which progress will be measured) within thirty (30) working days after Contract Award.

#### **1.8 FINAL AS-PLANNED SCHEDULE SUBMISSION, REVIEW AND APPROVAL**

- .1 The Consultant will accept the final as-planned schedule if it demonstrates that the Work will be performed in an orderly manner and in conformity with the Contract Time, subject to the constraints set out in the Contract, but such acceptance will neither impose on the Owner or the Consultant responsibility for the sequencing, scheduling or progress of the Work nor interfere with or relieve the Contractor from the Contractor's full responsibility therefore. Acceptance of the final as-planned schedule or any subsequent update by the Owner shall not be construed as a confirmation that the schedule is a reasonable plan for performing the Work.

- .2 Acceptance of final as-planned schedule showing scheduled Contract duration shorter than specified Contract duration does not constitute change to Contract Time.
- .3 Consider final as-planned schedule showing Work completed in less than specified Contract duration, to have float.

#### **1.9 COMPLIANCE WITH CONTRACT SCHEDULE**

- .1 The Contractor shall adhere to latest schedule approved by the Consultant.
- .2 The express or implied acceptance by the Owner or the Consultant of the final as-planned schedule and any progress schedules shall not constitute an approval or acceptance of the Contractor's construction means, methods, or sequencing or its ability to complete the work in a timely manner, and shall not place any obligation or responsibility on Owner towards the Contractor nor in any way limit the Contractor's obligations and responsibilities.

#### **1.10 PROGRESS MONITORING**

- .1 Monitor progress of Work in detail to ensure integrity of critical path, by comparing actual completions of individual activities with their scheduled completions, and reviewing progress of activities that have started but are not yet completed. Monitoring should be undertaken sufficiently often so that causes of delays are immediately identified and removed if possible.
- .2 On an ongoing basis, record "progress to date" on copy of schedule to be available at the Site. Inspect Work with the Owner and the Consultant at least bi-weekly to establish progress on each current activity.

#### **1.11 UPDATES AND REVISIONS TO SCHEDULE**

- .1 The Contractor's schedule is to be updated and resubmitted to the Consultant as a progress schedule at least once per month, on a date to be mutually agreed by the Contractor and the Consultant, together with the related data and reports required by this Section. Updated schedule is to include a 2 week look-ahead schedule in the form of a bar chart.
- .2 Each progress schedule shall record and report actual completion and/or start dates for each completed or in-progress activity, activity percent complete for in-progress activities and forecast completion dates for all activities that are not yet complete. Do not automatically update actual start and finish dates by using default mechanisms found in scheduling software. The progress schedule will show the projected completion date of the Work based on the progress information inserted into it, without changes to the schedule logic or the original duration of any activity. The Contractor shall use the retained logic option when executing schedule calculations. The final as-planned schedule (or an approved revision thereto) will be shown as a target schedule to indicate whether the current progress schedule remains on target, has slipped or is ahead of schedule.
- .3 The Contractor may then, in a second and subsequent update to the progress schedule, incorporate any logic and duration changes that represent its revised planning, provided all such changes are identified and documented in the schedule narrative required to accompany the progress schedule, and are agreed to by the Consultant.
- .4 If it appears that the progress schedule submitted by the Contractor no longer represents the actual sequencing and progress of the Work, the Consultant may instruct the Contractor to revise the progress schedule.
- .5 In order to improve the schedule, eliminate unforeseen problems or reduce the time required for an activity, modifications to the schedule may be suggested by the Contractor, Sub-Contractors, Owner or Consultant during the execution of the Contract, and such modifications may be implemented by mutual agreement. The Contractor shall submit to the Consultant for acceptance proposed adjustments to the final as-planned schedule or any subsequent updates that will not change the Contract Time.
- .6 If, at any time, the work is behind schedule with respect to the progress schedule currently in force, and if the Consultant believes there is a risk of the Work not being completed within the Contract Time as a result of such delay, the Contractor shall take all necessary measures to make up for such delay either by increasing staff, plant or facilities, or by amending its work methods, whichever is applicable.

- .7 In all cases of delay or potential delay, the Contractor shall keep the Owner and the Consultant informed of its intentions with regard to mitigation of such delay and the Owner's Consultant may, if it is deemed necessary, require the Contractor to revise all or part of its current progress schedule.
- .8 The current Contract Schedule can only be revised as agreed with the Owner and the Consultant by Change Order or an accepted revision to the logical sequence of described construction operations.
- .9 Once accepted, the revised schedule will become the current Contract Schedule against which progress is reported and to which subsequent updates will be compared. The new Contract Schedule will be clearly identified to show it as the current Contract Schedule.
- .10 Where the progress schedule shows completion of the Contract, or of any interim milestone, later than the Contract or milestone completion dates, acceptance of such progress schedules and of the monthly progress report will not constitute acceptance of the delay by the Consultant or the Owner.

#### 1.12 EXTENSIONS OF TIME

- .1 Float shall not be for the exclusive use of either the Contractor or the Owner. Extensions to the Contract Time will be granted only to the extent that appropriate adjustments to the duration of the affected activity exceed the total float time along the affected paths of the progress schedule in force at the time a Change Order or Change Directive is issued.
- .2 Submit to the Consultant, justification, project schedule data and supporting evidence for approval of extension to the Contract Time or interim milestone date when required. Include as part of supporting evidence:
  - .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 the 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 the Consultant.

#### 1.13 PROGRESS REPORTS

- .1 Monthly progress reports shall be prepared by the Contractor and submitted to the Consultant in the form of two (2) hard copies, plus one (1) electronic copy of the relevant schedule files, to demonstrate how the Work is actually progressing and the planned and detailed sequencing of the Work at the time of the report. The cut-off date for the monthly progress report shall be as instructed by the Consultant and the report shall be submitted no later than ten (10) Working Days after the cut-off date and accompanying the monthly progress draw.
- .2 Each monthly progress report shall be in a format acceptable to the Owner, and shall be arranged according to the following headings and sub-headings:
  - .1 Executive Summary.
    - .1 Activity to (date).
    - .2 Forecast activity to (date).
  - .2 Project Cost Information:
    - .1 Budget Summary.
    - .2 Cash Allowance Log.
    - .3 Change Order Log.
  - .3 Project Data:
    - .1 Project Schedule.

- .2 Shop Drawing Log.
- .3 Site Inspection Log.
- .4 Site Testing Log.
- .4 Critical Issues Log.
- .5 Site Photos.
- .3 Each monthly progress report shall include:
  - .1 An updated progress schedule, comparing actual and target progress for all milestones and activities. Sort activities by activity identification number and accompany with descriptions. List early and late start and finish dates together with durations, codes and float.
  - .2 Criticality report listing activities and milestones with up to five (5) days of total float used as first sort for ready identification of near critical paths through entire project. List early and late starts and finishes dates, together with durations, codes and float for critical activities.
  - .3 Progress report in early start sequence, listing for each trade, activities due to start, to be underway, or finished within two months 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.
  - .4 A schedule narrative, including:
    - .1 Detailed descriptions of progress, including each stage of procurement, fabrication, delivery to site, construction, installation, and testing;
    - .2 Discussion of the basis for any work sequencing, logic, interdependencies or original activity duration revisions incorporated into an updated progress schedule; and
    - .3 Comparisons of actual and planned progress, with a brief commentary on any actual or forecast delays or problems that might have an impact on the completion. date of the Work, and a discussion of the measures being (or to be) adopted to overcome these.
  - .5 Charts showing the status of submittals, permits and approvals, utility relocations, purchase orders, manufacturing/fabrication and construction.
  - .6 For each fabricated item, the name and location of the fabricator, percentage progress, and the actual or expected dates of commencement of fabrication, Contractor's inspections, tests and delivery.
  - .7 Progress photographs taken, prepared, and submitted in formats specified, all in accordance with Section 01 33 00.
  - .8 RFI log.
- .4 Timely submission of updates is of significant and crucial importance to the management of this project. Lack of or late receipt of updates diminishes their value to the Owner and the Consultant. Therefore, if the Contractor fails to submit any progress schedule or required revision to a progress schedule within the prescribed time period, the Owner, in its sole discretion, may hold back subsequent progress payments until the updated schedule is submitted or the revision is accepted.

#### 1.14 REVIEW OF MONTHLY PROGRESS REPORTS

- .1 The monthly progress reports and progress schedules will be used by the Owner and the Consultant to monitor the Contractor's performance against the current Contract Schedule.

2 Products

**Not Used**

3 Execution

**Not Used**

**END OF SECTION**

1 General

1.1 GENERAL

- .1 Provide submittals as requested by the Contract Documents, as specified herein, and in accordance with the conditions of the Contract.
- .2 In addition to submittals specifically requested by the Contract Documents, provide other submittals as may be reasonably requested by the Consultant, or as are required to coordinate the Work and to provide the Owner with choices available, within the scope of Contract Documents.
- .3 Contractor's review of submittals:
  - .1 Review submittals for conformity to Contract Documents before submitting to Consultant. Submittals shall bear stamp of Contractor and signature of a responsible official in Contractor's organization indicating in writing that such submittals have been checked and coordinated by Contractor. Contractor's review shall be performed by qualified personnel who have detailed understanding of those elements being reviewed and of the conditions at the Place of the Work proposed for installation.
  - .2 Check and sign each submittal and make notations considered necessary before submitting to Consultant for review. Where submittal is substantially and obviously in conflict with requirements of Contract Documents, reject submittal without submitting to Consultant and request resubmission. Note limited number of reviews of each submittal covered under Consultant's services as specified below.
  - .3 Contractor shall assume sole responsibility for any conflicts occurring in the Work that result from lack of comparison and coordination of submittals required for the Work.
  - .4 Submittals that have not been reviewed, checked, and coordinated by Contractor prior to submission to Consultant, will be rejected.
  - .5 Notify Consultant in writing of changes made on submittals from Contract Documents. Consultant's review of submittals shall not relieve Contractor of responsibility for changes made from Contract Documents not covered by written notification to Consultant.
- .4 Consultant's review of submittals:
  - .1 Review of submittals by Consultant is for the sole purpose of ascertaining conformance with the general design concepts and the general intent of the Contract Documents. This review shall not mean that Consultant approves the detail design inherent in the submittals, responsibility for which shall remain with the Contractor. Such review shall not relieve the Contractor of responsibility for errors or omissions in the submittals, or responsibility for meeting requirements of Contract Documents.
  - .2 Contractor shall be responsible for dimensions to be confirmed and correlated at the Place of the Work for information that pertains solely to fabrication processes or to techniques of construction and installation, and for coordination of the Work.
  - .3 As part of their scope of work, Consultant shall review shop drawings no more than twice. Should three or more reviews be required due to reasons of Contractor omissions causing resubmission requests, then Contractor shall reimburse the Consultant for time expended in these extra reviews. Time shall be invoiced to the Owner (to be deducted from monies due to the Contractor and paid to Consultant by Owner) at rates recommended by Consultant's professional association and disbursements shall be invoiced at Consultant's cost. The Contractor shall cover directly costs and administration associated with courier services and the like for these extra shop drawing reviews.
  - .4 Consultant's review and markings on submittals do not authorize changes in the Work or the Contract Time.



- .5 Submittals received but not required by the Contract Documents or requested by the Consultant will not be reviewed by the Consultant and will be marked 'NOT REVIEWED' by the Consultant and returned to the Contractor.
- .5 Make submittals with reasonable promptness and in an orderly sequence so as to cause no delay in the Work. Be responsible for delays, make up time lost and pay added costs, at no additional cost to the Owner, incurred because of not making submittals in due time to permit proper review by Consultant.
- .6 Submittals that contain substitutions will be rejected. Substitutions are permitted only on substitution submittals as specified in Section 01 25 16.
- .7 Do not proceed with work affected by a submittal, including ordering of Products, until relevant submittal has been reviewed by Consultant.
- .8 Prepare submittals using SI (metric) units.
- .9 Contractor's responsibility for errors and omissions in submittals is not relieved by Consultant's review of submittals.
- .10 Contractor's responsibility for deviations in submittal from requirements of Contract Documents is not relieved by Consultant's review of submittal, unless Consultant gives written acceptance of specific deviations.
- .11 Engineered submittals:
  - .1 Submittals for items required to be sealed by professional engineer (or as otherwise indicated as engineered), shall be prepared under the direct control and supervision of a qualified professional engineer registered in the Place of the Work, and having minimum professional liability insurance required in accordance with the General Conditions, as amended.
  - .2 Design includes life safety, sizing of supports, anchors, framing, connections, spans, and as additionally required to meet or exceed requirements of applicable codes, standards, regulations, and authorities having jurisdiction.
  - .3 Engineered submittals shall include design calculations, complete with references to codes and standards used in such calculations, supporting the proposed design represented by the submittal. Prepare calculations in a clear and comprehensive manner so that they can be easily reviewed. Incomplete or haphazard calculations will be rejected.
  - .4 The professional engineer responsible for the preparation of engineered submittals shall undertake periodic field review, including review of associated mock-ups, at locations wherever the work as described by the engineered submittal is in progress, during fabrication and installation of such work, and shall submit a field review report after each visit. Field review reports shall be submitted to the Consultant, to authorities having jurisdiction as required, and in accordance with the building code.
  - .5 Field reviews shall be at intervals as necessary and appropriate to the progress of the work described by the submittal to allow the engineer to be familiar with the progress and quality of such work and to determine if the work is proceeding in general conformity with the Contract Documents, including reviewed shop drawings and design calculations.
  - .6 Upon completion of the parts of the Work covered by the engineered submittal, the professional engineer responsible for the preparation of the engineered submittal and for undertaking the periodic field reviews described above, shall prepare and submit to the Consultant and authorities having jurisdiction, as required, a letter of general conformity for those parts of the Work, certifying that they have been Provided in accordance with the requirements both of the Contract Documents and of the authorities having jurisdiction over the Place of the Work.
  - .7 Costs for such field reviews and field review reports and letters of general conformity are included in the Contract Price.

- .12 Keep copies of reviewed submittals at the Place of the Work in a neat, orderly condition. Only submittals that have been reviewed by the Consultant's and are marked with Consultant's review stamp, as applicable, are permitted at the Place of the Work.
- .13 The Work shall conform to reviewed submittals subject to the requirements of this section. Remove and replace materials or assemblies not matching reviewed submittals at no increase in the Contract Time and at no additional cost to the Owner.

## 1.2 SUBMISSION PROCEDURES

- .1 Coordinate each submittal with requirements of the Work and Contract Documents. Individual submittals will not be reviewed until related information is available.
- .2 Distribute copies of submittals to parties whose work is affected by submittals except Consultant and Owner before final submission for review by Consultant.
- .3 Accompany submittals with transmittal letter, in duplicate, containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each submittal.
  - .5 Other pertinent data.
- .4 Each submittal shall be identified numerically by relevant specification section number with a numeric indicator for multiple submittals by that section followed by revisions number, for example 08 11 13-01-R0.
- .5 Make any changes in submittal that Consultant may require, consistent with Contract Documents, and resubmit as directed by Consultant.
- .6 Notify Consultant, in writing, when resubmitting, of any revisions other than those requested by Consultant.
- .7 After Consultant's review, distribute copies to affected parties.

## 1.3 CONSTRUCTION PROGRESS SCHEDULE

- .1 Submit proposed construction progress schedule at beginning of Project, as specified in Section 01 11 00 and Section 01 32 16.

## 1.4 PRODUCT DATA SHEETS

- .1 Submit Product data sheet prints; three (3) sets for Consultant (which includes 1 set that will be returned once submittal has been reviewed), 1 set for Contractor and 1 set each of applicable consulting engineers.
- .2 Submit Product data sheets for requirements requested in the Contract Documents and as the Consultant may reasonably request where shop drawings will not be prepared due to a standardized manufacture of a Product. Manufacturers' catalogue cuts will be acceptable in such cases, providing that they are 8-1/2" x 11" originals, and that they indicate choices including sizes, colours, model numbers, options and other pertinent data, including installation instructions. Submissions showing only general information are not acceptable.
- .3 Where requirements of Contract Documents are more stringent than design proposed on Product data sheets, the requirements of the Contract Documents take priority.
- .4 Upon completion of review by Consultant, one (1) marked set of Product data sheets will be returned to Contractor for reproduction and distribution.
- .5 Retain one (1) complete set of prints of reviewed Product data sheets for issuance to Owner immediately prior to Substantial Performance of the Work, in an acceptable, bound manner.

## 1.5 SHOP DRAWINGS

- .1 Submit shop drawings for which submission is required in other Sections of this Specification. Include in final shop drawing submissions detailed information, templates and installation instructions required for incorporation and connection of the work concerned, and other details as may be specified in other Sections.
- .2 In addition to shop drawings specified in other Sections, submit shop drawings required by authorities having jurisdiction in accordance with their requirements.
- .3 The General Contractor shall check, sign, and make notations he considers necessary on shop drawings before each submission to the Consultants for their review.
- .4 Indicate on each submission changes from the Contract Drawings and Specification that have been incorporated in the shop drawings. The Contractor shall be responsible for changes made from the Contract Drawings and Specification which are not indicated or otherwise communicated in writing with the submission.
- .5 Shop drawing review by Consultant or sub-consultants is for the sole purpose of ascertaining conformance with the general design concept and as a precaution against oversight or error. This review shall not mean that Consultant and sub-consultants approve the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract Documents. No review of design shall be assumed made when such design is a responsibility of the Contractor included in the work. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for coordination of the work of all Subcontractors.
- .6 Show on shop drawings all pertinent information required for materials and installation, and for proper integration of this installation with work of others.
- .7 The shop drawings shall show, but not necessarily be limited to the following:
  - .1 Clear and obvious notes of any proposed changes from Drawings and Specifications.
  - .2 Fabrication and erection dimensions.
  - .3 Provisions for allowable construction tolerances and deflections provided for live loading.
  - .4 Details to indicate construction arrangements of the parts and their connections, and interconnections with other work.
  - .5 Location and type of anchors, and exposed fastenings.
  - .6 Materials and finishes.
  - .7 Descriptive names of equipment.
  - .8 Mechanical and electrical characteristics when applicable.
  - .9 Information to verify that superimposed loads will not affect function, appearance, and safety of the work detailed as well as of interconnected work.
  - .10 Assumed design loadings, and dimensions and material specifications for load bearing members.
  - .11 Dimensions and dimensioned locations of proposed chases, sleeves, cuts and holes in structural members.
- .8 Submit shop drawings folded into 8-1/2" x 11" size with title block appearing on outside. Four (4) copies of engineering data sheets, catalogue cuts and standard diagrams may be substituted for shop drawings where applicable. One (1) reproducible and three (3) white prints of each drawing are required.

- .9 Shop drawings which require extensive correction or are in substantial disagreement with intent of contract documents will be sent back for revisions and resubmission. The reproducible copy will be returned.
- .10 Otherwise, shop drawings will be sent back with review comments only. The reproducible copy and two (2) white prints will be returned. One (1) white print will be retained.
- .11 Conform to review comments and stamped instructions of each shop drawings reviewer.
- .12 Only drawings noted for revision and resubmission need be resubmitted. Include revisions required by previous reviews before resubmission of shop drawings.
- .13 Do not add new details or information to shop drawings after they have been reviewed, unless requested by the reviewer, requiring a re-submission.
- .14 Do not proceed with work dependent on shop drawing information until approval is given and verification received from Contractor. The Contractor shall be responsible for work performed prior to receipt of reviewed shop drawings. No review comments shall be construed as authorization for Changes in the work.
- .15 Fabricate work exactly as shown on shop drawings. If shop practice dictates revisions, revise drawings and resubmit.
- .16 File one (1) copy of each finally revised and corrected shop drawing on site.
- .17 Provide shop drawings as called for in the Trade Sections of these Specifications.

#### **1.6 SAMPLES**

- .1 Submit samples for which submission requirement is specified in Trade Sections of this Specification.
- .2 Submit samples in triplicate of adequate size to represent the material in its intended use on Project. Submit an extreme range of samples when the degree of marking or colour cannot be represented by a single sample.
- .3 Label samples with Project name, number, Contractor, and date.
- .4 Include in the work cost of delivery and handling, assembly, and return to supplier of samples.
- .5 If sample is disapproved, two samples will be returned. If sample is approved, one sample will be returned, marked "Approved".
- .6 Approved samples shall serve as a model against which the products incorporated in the work shall be judged.
- .7 Each product incorporated in the work shall be precisely the same in all details as the approved sample.
- .8 Should any change of material, colour, texture, finish, dimensions, performance, function, operation, construction, joining, fastening, fabrication techniques, service characteristics, and other qualities be made to a product after approval has been given, submit for approval of the revised characteristics in writing and resubmit samples of the product for approval if requested.
- .9 When samples are very large, require assembly, or require evaluation at the site, they may be delivered to the site, but only with approval and as directed.
- .10 Provide samples as called for in the Trade Sections of these Specifications.

#### **1.7 MOCK-UPS**

- .1 Where required by the Contract Documents or as may reasonably be requested by the Consultant during the course of the Work, Provide field or shop erected example of work complete with specified materials and workmanship.
- .2 Erect mock-ups at locations as specified and as acceptable to Consultant. Do not proceed with work for which mock-ups are required prior to Consultant's review of mock-ups.

- .3 Modify or remove and replace mock-ups as many times as required to secure acceptance of the Consultant. Such removal and replacement shall be done at no increase in either the Contract Price or the Contract Time.
- .4 Protect and maintain mock-ups until directed to be removed. Commence work demonstrated in mock-up only after review and acceptance of workmanship. If possible, mock-up may become part of finished work, at sole discretion, and with prior written acceptance, of Consultant.
- .5 Reviewed and accepted mock-ups will become standards of workmanship and material against which installed work will be compared.
- .6 Remove and replace materials or assemblies not matching reviewed mock-ups.
- .7 Resubmit mock-ups until written acceptance is obtained from Consultant.

#### **1.8 INSERT LOCATION DRAWINGS**

- .1 Submit insert location drawings which are required for installation of work.
- .2 Indicate on insert location drawings the location and size of sleeves, anchor bolts, openings and miscellaneous items to be incorporated in the work.
- .3 Submit insert location drawings well in advance of construction of work incorporating built-in work.

#### **1.9 COORDINATION DRAWINGS**

- .1 Prepare interference and equipment placing drawings to ensure that all components will be properly accommodated within the spaces provided.
- .2 Prepare drawings to indicate coordination and methods of installation of a system with other systems where their relationship is critical. Ensure that all details of equipment, apparatus, and connections are coordinated.
- .3 Ensure that clearance required by authorities having jurisdiction and for proper maintenance are indicated on Drawings.
- .4 Distribute coordination drawings well in advance of fabrication and installation of work affected. Place no orders for affected equipment without submission of coordination Drawings to the supplier.

#### **1.10 PROJECT RECORD DRAWINGS**

- .1 Submit Project Record Drawings specified under work of Section 01 31 13 with application for Certificate of Substantial Performance. Final acceptance of the work will be predicted on receipt and approval of record drawings.

#### **1.11 WARRANTIES**

- .1 The Contractor shall submit all the warranties as herein specified, in an approved uniform format as indicated in Section 01 78 36 Warranties.

#### **1.12 MAINTENANCE MANUAL AND OPERATING INSTRUCTIONS**

- .1 Submit three (3) copies of Operation and Maintenance Manuals at completion of Project on application for Certificate of Substantial Performance, Maintenance Manual shall consist of shop drawings, extended warranties and Project Data Book.
- .2 Include in Maintenance Manual one copy of each final approved shop drawing issued for Project of which have been recorded changes made during fabrication and installation caused by unforeseen conditions.
- .3 Submit extended warranties together in one report binder, properly titled and with a typed table of contents.
- .4 The Project Data Book shall:
  - .1 Consist of a hard-cover, black, vinyl-covered, loose-leaf, letter size binder.

- .2 Have a title sheet, or sheets preceding data on which shall be recorded Project name, date, list of contents, and Contractors' and Subcontractors' names and addresses.
- .3 Be organized into applicable sections of work with each Section separated by hard paper dividers with plastic covered tabs marked by Section.
- .4 Contain only typed or printed information and notes, and neatly drafted drawings.
- .5 Contain maintenance instructions as specified in various Sections and as referenced in Section 01 77 19.
- .6 Contain brochures and parts lists on all equipment.
- .7 Contain a list of manufacturers and trade names of finishes and coatings applied.
- .8 Contain sources of supply for all proprietary products used in the work.
- .9 Contain lists of supply sources for maintenance of all equipment in Project of which more detailed information is not included above.
- .10 Contain finished hardware schedule.

### 1.13 AS-BUILT DOCUMENTS

- .1 Obtain from the Consultant and pay cost for one copy of Specifications and one set of white prints of the Contract Drawings at the commencement of Work, and, prior to the date of Substantial Performance, an extra set of white prints of Contract Drawings, for as-built purposes.
- .2 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .3 As Work progresses, clearly mark in a neat and legible form with red pen on Specifications and drawing white prints all significant changes and deviations from the Contract Drawings and Specifications caused by site conditions, Supplemental Instructions and Change Orders.
  - .1 Changes and deviations marked on as-built record drawings and specifications by reference to Supplemental Instructions, Change Orders and other documents are not acceptable.
- .4 Record the following changes and deviations on drawing white prints:
  - .1 Depths of various elements of foundation in relationship to the first floor level.
  - .2 Field changes of dimensions.
  - .3 Changes made by Addenda and change orders.
  - .4 Details not on original Contract Drawings.
  - .5 Other significant deviations and changes which are concealed in construction and cannot be identified by visual inspection.
- .5 Show actual locations of the following on drawing white prints:
  - .1 Access doors and panels.
  - .2 Inverts of services at key points within the building, at points where entering and leaving the building, and at the property lines. Dimension services in relation to the structure and building grid lines.
  - .3 Measured horizontal and vertical locations of site utilities and appurtenances, referenced to permanent surface improvements.
  - .4 Ductwork, piping, conduit, mechanical and electrical equipment and associated work.
  - .5 Concealed piping, conduit and equipment, including such items provided for future use.
- .6 Record the following information on the Specifications.
  - .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.
- .3 Accepted substitutions and alternatives.
- .4 Other approved changes and deviations to items specified.
- .7 Have white prints and specifications available for review at all times.
- .8 Final As Built Drawings: Prior to the date of Substantial Performance, allowing for Consultant's review, clearly, neatly and accurately transfer information from the marked-up drawing white prints to a set of clean white prints.
  - .1 Print lettering and numbers in size to match original.
  - .2 Lines may be drawn free hand, provided they are neat and accurate. Add "AS-BUILT RECORD" at each drawing title block. Should extensive changes and deviations to a drawing make the information illegible, re-draft the changed areas as required.
  - .3 Submit drawing white prints made containing as-built record information for Consultant's review. Correct as directed by Consultant.
  - .4 Submit finalized as-built record drawing transparencies and as-built record specifications to the Consultant two weeks prior to application for Certificate of Substantial Performance.

#### **1.14 EXTRA MATERIALS**

- .1 Supply extra materials at completion of Project as specified in Trade Sections of this Specification.
- .2 Deliver extra materials to location designated by the Owners representative.

#### **1.15 INSPECTION COMPANY REPORTS**

- .1 Submit copies of test and verification reports as specified in Section 01 45 00 and in other Sections of the Specifications of "Source Quality Control" and "Field Quality Control" immediately they are completed.
- .2 Submit one copy of each report unless specified otherwise, and signed by a responsible officer of the inspection and testing company to the Owner and Consultant.
- .3 Submit an additional report directly after it is completed to:
  - .1 Applicable design engineer.
  - .2 The Contractor.
  - .3 Authorities having jurisdiction when such reports are required by them.
- .4 Each report shall include:
  - .1 Date of issue.
  - .2 Project name and number.
  - .3 Name and address of inspection and testing company.
  - .4 Name and signature of inspector or tester.
  - .5 Date of inspection or test.
  - .6 Identification of product and Specifications Section covering inspected or tested work.
  - .7 Location of inspection or from which tested material was derived.
  - .8 Type of inspection or test.
  - .9 Remarks and observations on compliance with Contract Documents.

**1.16 PROGRESS PHOTOGRAPHS**

- .1 Unless otherwise specified, provide and submit electronic pictures from six (6) different vantage points on the project site as directed, and taken as soon as possible after the first day of each month throughout the project.
- .2 Identify the following in each picture:
  - .1 Location;
  - .2 Name of project;
  - .3 Name of Contractor;
  - .4 Name of Consultant
  - .5 Date
- .3 The Consultant may request changes of vantage points, either interior or exterior, as the job progresses. Consultant may further request more than six (6) vantage points.
- .4 Submit pictures with each application for payment.

**1.17 PROGRESS BILLING**

- .1 Coordinate progress billing with cost breakdown.
- .2 Include value of work completed during billing period.
- .3 Include running total of value of work completed by the end of the billing period.
- .4 Format of progress billing shall be as requested by and approved by the Owner.
- .5 Progress billings shall be dated and submitted on the 25 day of each month.
- .6 Progress billings shall be discussed as part of the preconstruction meeting.

**1.18 PRICING OF CHANGES TO WORK**

- .1 Submit with quotations for changes to work detailed estimate sheets showing initial and revised quantities of labour, materials and equipment, and the related unit costs.
- .2 Payment for use of small tools, travelling, out-of-town accommodations and preparation of price change submittals will be considered a part of overhead as specified in the Supplementary Conditions.
- .3 Submit quotations within ten (10) days of issuance of the contemplated change for changes to work with full documentation to Consultant.

**1.19 WASTE MANAGEMENT**

- .1 Contractor shall prepare and submit waste audit and reduction plan in compliance with the requirements of Ontario Regulations 102/94, Waste Audits and Waste Reduction Workplans and 103/94, Industrial, Commercial and Institutional Source Separation Programs under the Environmental Protection Act of Ontario. For definitions refer to Ontario Regulation 105/94, Definitions.
- 2 Products  
**Not Used**
- 3 Execution  
**Not Used**

**END OF SECTION**



1 General

**1.1 AUTHORITIES HAVING JURISDICTION**

- .1 Where reference is made to "authorities having jurisdiction", it shall mean all authorities who have within their constituted powers the right to enforce the laws of the place of the building.

**1.2 DEFINITIONS**

- .1 The "Constructor" named in the latest addition of The Occupational Health and Safety Act, and the Workplace Safety and Insurance Board (WSIB) Regulations, of the Province of the place of the Work, including any amendments, shall mean the "Contractor" for the work performed under this Specification.

**1.3 FIRE PREVENTION AND SAFETY**

- .1 Enforce fire protection methods, good housekeeping, and adherence to local and underwriter's fire regulations. Provide ULC approved fire extinguishers, and other fire fighting services and equipment except where more explicit requirements are specified as the responsibility of individual Sections.
- .2 Maintain clear emergency exit paths for personnel at all times.
- .3 Use only fire resistant tarpaulins and similar protective covering on site.

**1.4 FIRE PROTECTION OF STRUCTURE**

- .1 Ensure that nothing subverts the integrity of fire protection provided for the building structure.
- .2 Provide fire protection of structural members for their entire length and girth.
- .3 Coordinate work of all Sections so that they do not encroach on space required for fire protection and its installation. Ensure that fire protection damaged during construction is totally replaced.

**1.5 FIRE SEPARATIONS**

- .1 Ensure that fire separations are installed to maintain total integrity and that they are not diminished or breached by work following their installation.
- .2 Replace fire separations which have suffered a lessening of their required rating during construction.

**1.6 WASTE MANAGEMENT**

- .1 Comply with all applicable regulations and requirements of the place of the Work. Waste Audits and Waste Reduction Workplans, Industrial, Commercial and Institutional Source Separation Programs under the Environmental Protection Act of the place of the Work, including preparing and submitting waste audit and reduction plan specified in Section 01 33 00.

**1.7 ENERGY EFFICIENCY**

- .1 The building has been designed and will be constructed by the Contractor to high quality engineering practice as described in ASHRAE/IES 90.1, "Energy Efficient Design of New Buildings Except Low-rise Residential Buildings" as interpreted by the "Guidelines for the Interpretation of ASHRAE/IES 90.1".

**1.8 REQUIREMENTS OF REGULATORY AGENCIES**

- .1 Work shall include protection measures consisting of materials constructions and methods, and first-aid equipment and personnel, required by the latest edition of The Occupational Health and Safety Act, and the Workplace Safety and Insurance Board (WSIB) Regulations, of the Province of Ontario, and as otherwise imposed by authorities having jurisdiction to save persons and property from harm.
- .2 Ensure that pollution, noise pollution and environmental control of construction activities are exercised as required during the work.

- .3 Except where special permission is obtained, maintain clear access for roads and sidewalks on public property.
- .4 Maintain all (Municipal and Provincial) roads and sidewalks clear of construction materials and debris, including excavated material. Clean roads and sidewalks as frequently as required to ensure that they are cleared of materials, debris and excavated material.
- .5 Remove snow and ice from sidewalks as required and to the standards acceptable by the Municipality.

## 1.9 REFERENCE STANDARDS

- .1 Where edition date is not specified, consider that references to manufacturer's and, published codes, standards and specifications are made to the latest edition (revision) approved by the issuing organization, current at the date of this Specification.
- .2 Reference standards and specifications are quoted in this Specification to establish minimum standards. Work of quality or of performance characteristics that exceeds these minimum standards will be considered to conform.
- .3 Should the Contract Documents conflict with specified reference standards or specification, the General Conditions of the Contract shall govern.
- .4 Where reference is made to manufacturer's directions, instructions or specifications they shall include full information or storing, handling, preparing, mixing, installing, erecting, applying, or other matters concerning the materials pertinent to their use and their relationship to materials with which they are incorporated.
- .5 Have a copy of each code, standard and specification, and manufacturer's directions, instructions and specifications, to which reference is made in the Specifications, always available at construction site.
- .6 Standards, specifications, associations, and regulatory bodies are generally referred to throughout the specifications by their abbreviated designations. These are as follows:

AA	The Aluminum Association
AAMA	American Architectural Manufacturer's Association (USA)
ACI	American Concrete Institute
AISI	American Iron and Steel Institute
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASTM	American Society for Testing and Materials
AWI	Architectural Woodwork Institute
AWMAC	Architectural Woodwork Manufacturers Association of Canada
AWS	American Welding Society (USA)
CGSB	Canadian General Standards Board
CISC	Canadian Institute of Steel Construction
CLA	Canadian Lumbermen's Association
CPMA	Canadian Paint Manufacturers Association
CRCA	Canadian Roofing Contractors Association
CSA	Canadian Standards Association
CSSBI	Canadian Sheet Steel Building Institute
FM	Factory Mutual
GANA	Glass Association of North America
MPI	Master Painters Institute
MTO	Ministry of Transportation of Ontario
NAAMM	National Association of Architectural Metal Manufacturer's
NBC	National Building Code
NEMA	National Electrical Manufacturer's Association
NFC	National Fire Code of Canada
NFPA	National Fire Protection Association (USA)
NHLA	National Hardwood Lumber Association

NLGA	National Lumber Grades Authority
NRC	National Research Council
OAA	Ontario Association of Architects
OBC	Ontario Building Code
OFC	Ontario Fire Code
OGCA	Ontario General Contractors Association
OPCA	Ontario Painting Contractors Association
OPSS	Ontario Provincial Standard Specification
OIRCA	Ontario Industrial Roofing Contractors Association
PEI	Porcelain Enamel Institute (USA)
SAE	Society of Automotive Engineers
SJI	Steel Joist Institute
SSPC	Steel Structures Painting Council
TTMAC	Terrazzo, Tile and Marble Association of Canada
ULC	Underwriters Laboratories of Canada
ULI	Underwriters Laboratories Incorporated (USA)

2 Products

**Not Used**

3 Execution

**Not Used**

**END OF SECTION**

1 General

**1.1 GENERAL**

.1 Related Requirements Specified Elsewhere:

- .1 Inspections and testing required by the laws, ordinances, rules and regulations of authorities having jurisdiction:
  - .1 General Conditions of the Contract.
- .2 Verification by certification that specified products meet requirements of reference standards:
  - .1 In applicable Sections of the Specification.
- .3 Testing, balancing and adjusting of equipment:
  - .1 In applicable mechanical and electrical Sections of the Specification.
- .4 Cutting and Patching:
  - .1 Section 01 31 13.
- .5 Submission of Inspection and Testing Reports:
  - .1 Section 01 33 00.

**1.2 TOLERANCES FOR INSTALLATION OF WORK**

- .1 Unless acceptable tolerances are otherwise specified in a Section or a reference standard or are otherwise required for proper functioning of equipment, site services, and mechanical and electrical systems:
  - .1 "plumb and level" shall mean plumb or level within 3mm in 3048mm (1/8" in 10').
  - .2 "square" shall mean not in excess of 10 seconds lesser or greater than 90 degrees.
  - .3 "straight" shall mean within 3mm (1/8") under a 3048mm (10') long straight edge.

**1.3 CONSTRUCTION REVIEW**

- .1 The Consultant and his sub-consultants may carry out construction review during the progress of the work. The Consultant's general review during construction, and inspection and testing by independent inspection and testing companies reporting to the Consultant, are both undertaken to inform the Owner of the Contractor's performance and shall in no way augment the Contractor's quality control or relieve him of contractual responsibility.

**1.4 QUALITY CONTROL**

- .1 Bring to the attention of the Consultant any defects in the work or departures from the Contract Documents which may occur during construction. The Consultant will decide upon corrective action and state his recommendations in writing.
- .2 The Consultant may appoint and direct inspection and testing companies to review completed work in addition to inspection and testing specified for inclusion in the work under Source and Field Quality Control in other Sections.

**1.5 INSPECTION AND TESTING**

- .1 Owner will, with recommendations of Consultant, appoint Testing and Inspection Companies, representing, reporting and responsible to Owner through Consultant for testing services except for the following which shall be Contractor's responsibility:
  - .1 Inspection and testing required by laws, ordinances, codes, rules, regulations, plan approval authorities, other legally constituted authority and/or by authorities having jurisdictions,

- .2 Inspection and testing required by Contract Documents specified to be carried out by Contractor,
- .3 Inspection and testing performed exclusively for Contractor's convenience.
- .4 Additional testing required because of changes in materials, proportions of mixes requested by Contractor and Subcontractors as well as any extra testing of materials occasioned by lack of identification or by their failure to meet Specification requirements
- .5 Testing of structure or elements including load testing,
- .6 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.
- .7 Mill tests and certificates of compliance.
- .2 Source and Field Quality Control Specified in Other Sections:
  - .1 This Section includes requirements for performance of inspection and testing specified under Source Quality Control and Field Quality Control in other Sections of the Specification.
  - .2 Do not include in work of this Section responsibilities and procedures that relate solely to an inspection and testing company's function under the direction of the Owner and that are specified in another Section which is paid for directly by the Owner. Such information is included in this Section for only the Contractor's information.
- .3 Do not limit responsibility for ensuring that products and execution of the work meet Contract requirements and inspection and testing required to this end, to specified inspection and testing.
- .4 Payment for Inspection and Testing Services:
  - .1 Payment for specified inspection and testing will be made by the Contractor, as required by each applicable Section.
  - .2 Payment for reinspection and retesting of defective and rejected work shall be made by the Owner and backcharged to the Contractor.
  - .3 Contractor to engage approved company(s) for inspections and tests for additional inspections and tests as may be performed for the Contractor's own purposes and convenience. Include cost of this inspection and testing in the Stipulated Price Contract.
  - .4 Include cost in the Stipulated Price Contract for tests of reinforcing steel for which no mill tests are submitted.

## 1.6 INSPECTION AND TESTING SERVICES AND REFERENCE STANDARDS

- .1 Qualifications of Inspection and Testing Companies:
  - .1 Companies engaged for inspection and testing shall provide equipment, methods of recording and evaluation, and knowledgeable personnel to conduct tests precisely as specified in reference standards.
  - .2 If requested, submit affidavits and copies of certificates of calibration made by an accredited calibrator to verify that testing equipment was calibrated and its accuracy ensured within the previous twelve months.
  - .3 Inspection and testing of concrete and concrete materials will be carried out by a CSA Certified testing laboratory to CSA A283, for review in accordance with CSA A23.1/A23.2.
- .2 Reference Standards:
  - .1 Perform inspection and testing in accordance with standards quoted and as required by procedures described in specified reference standards that are applicable to the work being inspected and tested.

## 1.7 SUBMITTALS

- .1 Submit inspection and testing reports in accordance with Section 01 33 00.

### 1.8 RESPONSIBILITIES OF THE CONSULTANT

- .1 The Contractor will submit a list of Inspection and Testing companies to the Consultant for his review.
- .2 The Consultant and Contractor will direct inspection and testing companies in the type and extent of inspection and testing to be undertaken.
- .3 The Consultant will receive submitted reports of inspections and tests for evaluation and will decide upon any actions that may be required.
- .4 The Consultant will provide Drawings and Specifications required by inspection and testing companies.

### 1.9 RESPONSIBILITIES OF THE CONTRACTOR

- .1 Inspection and testing performed by firms engaged for Source and Field Quality Control specified in other Sections shall not relieve the Contractor from responsibility of performing his work in accordance with the Contract Documents.
- .2 Provide access for inspection and testing personnel to work in progress and to fabricator's operations.
- .3 Provide samples of materials to be tested in required quantities at locations testing is performed.
- .4 Submit copies of mill test reports in accordance with Section 01 33 00.
- .5 Provide labour and facilities:
  - .1 To facilitate inspections and tests.
  - .2 For storing of specimens at required temperature and free from vibration, in conformance with reference standard and inspection and testing company instructions.
  - .3 For obtaining, handling and transporting of samples at site and plant.
- .6 Notify Consultant, and inspection and testing company at least 48 hours before work to be inspected and tested commences.
- .7 When it is discovered on inspection that work is proceeding with incorrect materials or methods, ensure that corrections are immediately made and that improperly completed work is replaced.
- .8 Inspect all work done by subtrades prior to application of final cover materials i.e. pressure plates, drywall ceilings, concrete slab pours and the like.

### 1.10 RESPONSIBILITIES OF INSPECTION AND TESTING COMPANIES

- .1 Determine from Specifications and Drawings the extent of inspection and testing required for work of contract as directed by Consultant. Notify Consultant of any omissions or discrepancies in the work inspected and/or tested.
- .2 Perform applicable inspection and testing described in the Specification and as may be additionally directed.
- .3 Provide competent inspection and testing personnel when notified by the Contractor that applicable work is proceeding. Inspection personnel shall co-operate with the Consultant and Contractor to expedite the work.
- .4 Inform the Consultant of intended scheduling of inspections and of each visit of inspection personnel to the work site and fabricator's operations.
- .5 Notify the Consultant and Contractor of deficiencies and irregularities in work immediately they are observed in course of inspections and tests.
- .6 Inspection and testing companies shall not perform or supervise any of the Contractor's work, and shall not authorize:
  - .1 Performance of work that is not in strict accordance with the Contract Documents.
  - .2 Approval or acceptance of any part of the work.

### 1.11 INSPECTION AND TESTING PROCEDURES

- .1 Perform specified inspection and testing only in accordance with specified reference standards, or as approved.
- .2 Observe and report on compliance of work to requirements of Contract Documents.
- .3 Ensure that inspectors are on site or at fabricator's operations for full duration of critical operations, and as otherwise required to determine that work is being performed in accordance with the Contract Documents.
- .4 Identify samples.
- .5 Identify sources of materials.
- .6 Review and report on progress of work. Report on count of units fabricated and inspected at fabricator's operations.
- .7 Observe and report on conditions of significance to work in progress at time of inspection or at fabricator's operations. Include where applicable and if critical to work in progress:
  - .1 Time and date of inspection.
  - .2 Temperature of air, materials and adjacent surfaces.
  - .3 Humidity of air, and moisture content of materials and adjacent materials.
  - .4 Presence of sunlight, wind, rain, snow and other weather conditions.
- .8 Include in reports all information critical to inspection and testing.
- .9 Ensure that only materials from the work and intended for use therein are tested.
- .10 Determine locations for work to be tested.

### 1.12 DEFECTIVE WORK

- .1 Where factual evidence exists that defective workmanship has occurred or that work has been carried out incorporating defective materials, the Consultant may have tests, inspections or surveys performed, analytical calculation of structural strength made, and the like, in order to help determine whether the work must be replaced. Testing, retesting, inspections or surveys carried out under these circumstances will be made at the Contractor's expense, regardless of their results, which may be such that, in the Consultant's opinion, the work may be acceptable.
- .2 All testing shall be conducted in accordance with the requirements of the Consultant.
- .3 Defective work discovered before expiration of the warranty period specified in the General Conditions of the Contract, as may be extended in this Specification, will be rejected, whether or not is has been previously inspected. If rejected, defective materials or work incorporating defective materials or workmanship shall be promptly removed and replaced or repaired to the satisfaction of the Consultant, at no expense to the Owner.

2 Products

**Not Used**

3 Execution

**Not Used**

**END OF SECTION**

1 General

1.1 GENERAL

- .1 Include in the work construction of temporary facilities as required for the performance of the work as construction aids and as required by authorities having jurisdiction, or as otherwise specified. Install to meet needs of construction as work progresses. Maintain construction and temporary facilities during use, repair them when damaged, relocate them as required by the work, remove them at completion of need, and make good adjacent work and property affected by their installation.
- .2 Include in the work, construction of temporary facilities to provide for construction safety such as: fences, barricades, bracing, supports, storage, sanitation and first aid facilities, fire protection, stand pipes, electrical supply, temporary heat, steam supply, ventilation, construction equipment with its supports and guards, stairs, ramps, platforms, runways, ladders, scaffolds, guardrails, temporary flooring, rubbish chutes, and walkway, morality and guard lights, all as required of the Construction by the Occupational Health and Safety Act of the Province of Ontario, latest edition, as well as all other regulations of the authorities having jurisdiction.
- .3 Construct temporary work of new materials unless otherwise approved.
- .4 Ensure that structural, mechanical, and electrical characteristics of temporary facilities are suitable and adequate for the use intended. Be responsible that no harm is caused to persons and property by failure of temporary facilities because of placing, locations, stability, protection, structural sufficiency, removal, or any other cause.
- .5 Prepare shop drawings and specifications of temporary work, and submit for approval of authorities having jurisdiction if so required. Submit duplicate copy to Consultant for his information.
- .6 Locate temporary facilities where shown on Drawings or as directed.
- .7 Apply two coats of paint, in approved colours, to temporary constructions, such as storage sheds; offices; supports; bracing and back side of signs; barricades; and where otherwise specified.
- .8 Temporary Electric Service:
  - .1 Provide and maintain an adequate temporary electrical service for performance of the Work including, but not limited to, operation of electric pumps, motors, vibrators and other power tools, hoisting and related construction and general illumination during the Work. Provide power at temporary storage sheds and field office when required.
  - .2 Make connections available to any part of the work within distance of a 3048mm (10') extension. Each Subcontractor shall be responsible for their own extension cords.
  - .3 Contractor shall provide and be responsible for payment of temporary power required for all equipment for construction use in excess of available existing sources.
  - .4 Provide and maintain any components and equipment necessary to transform supply power to necessary temporary power voltage.
  - .5 Contractor will be permitted use of existing power for construction purposes at no cost to the Contractor. Provide additional temporary power for individual tasks required by the technical sections
- .9 Temporary Lighting:
  - .1 Install lighting for the following:
    - .1 Emergency evacuation, safety and security throughout the Project at intensity levels required by authorities having jurisdiction.
    - .2 Performance of work throughout work areas as required, evenly distributed, and at intensities to ensure proper installations and applications are achieved.



- .3 Performance of finishing work in areas as required, evenly distributed, and of an intensity of at least 30 foot candles.
- .2 Permanent lighting may be used during construction, provided lamps, fluorescent tubes and ballasts that are so used are replaced with new at time work is turned over to Owner.
- .10 Temporary Heating and Ventilation:
  - .1 Provide and pay for temporary heating, cooling and ventilating required for the Work, including attendance, maintenance and fuel.
  - .2 Provide temporary heat and ventilation as required to:
    - .1 Facilitate continuous uninterrupted progress of the Work.
    - .2 Protect the Work and Products against damage and defacement caused by weather, harmful levels of temperature, humidity, and moisture.
    - .3 Provide ambient temperatures and humidity levels for proper storage, installation and curing of materials, in accordance with specified standards and manufacturer's requirements.
    - .4 Provide adequate ventilation to meet health regulations for safe working environment.
  - .3 Maintain work areas at not less than 7 deg C. Increase temperatures in isolated areas to 20 deg C as required by various sections of the specifications or by Product manufacturers.
  - .4 Solid fuel salamanders will not be permitted.
  - .5 Replace with new, any work damaged due to failure to provide adequate heat at no cost to Owner.
  - .6 If possible, and when approved by the Owner, the permanent heating and ventilation system may be used during construction. If approved, the Contractor shall be responsible for its operation, and for replacing and repairing damage it may suffer, and shall assume operation and maintenance of the system in all its parts and payment for fuel consumed.
  - .7 Operation and maintenance shall include inspection at least every two weeks of thermostats, valves, switches, lubrication, fan, belt and motor adjustment, cleaning and/or replacement of filters, and replacement of filters and re-servicing of system at completion of work.
  - .8 Connect electric motors only to permanent source of power, or otherwise provide proper source with correct design characteristics and with no fluctuation in voltage.
  - .9 Commence warranty period after re-servicing and from time the Owner takes over the premises.
- .11 Temporary Water Supply:
  - .1 Provide water of potable quality for all construction purposes, at one location at least, on each floor area.
  - .2 Extend supply pipe or pipes from nearest available sources and maintain in good condition until no longer required.
  - .3 If possible, and when approved by the Owner, the permanent site water source be used to provide water during construction.
- .12 Temporary Sanitary Facilities:
  - .1 Provide sanitary facilities for persons on the work site as approved by the authorities having jurisdiction. Install them in sufficient number and maintain them in a sanitary condition.

- .2 Do not permit construction personnel to use washroom and toilet facilities on premises which have been installed as part of the new work or which are part of the existing building for use by non-construction personnel.
- .13 Connections to Utilities:
  - .1 Make arrangements for connections to water, sewer, gas, electric, and telephone utilities as required for temporary use during construction.
  - .2 The Owner is responsible for payment of final connection charges that are part of service contracts between him and each utility.

## 1.2 CONSTRUCTION AIDS

- .1 Building Enclosure:
  - .1 Include in work, temporary enclosures for building as required to protect it, in its entirety or in its parts, against the elements, to maintain environmental conditions required for work within the enclosure, and to prevent damage to materials stored within. Design enclosures to withstand wind pressures required for the building by authorities having jurisdiction.
  - .2 Use structural framing of building for support of temporary enclosure framing only upon verification that the load limits of the building frame will not be exceeded. Erect enclosures to allow complete accessibility for installation of materials during the time enclosures remain in place.
- .2 Scaffolding:
  - .1 Each Subcontractor shall provide their own scaffolding.
  - .2 Scaffolding shall be erected clear of walls, and to ensure that it does not interfere with continuing work.
  - .3 Subcontractor shall be responsible for its examination for sufficiency of his scaffolding and be responsible for accidents due to its insufficiency.
- .3 The Contractor will be responsible for co-ordination of scaffold work if multiple trade usage can be achieved from one installation.

## 1.3 TEMPORARY BARRIERS

- .1 Provide temporary hoarding as specified in Section 01 56 26 Temporary Fencing and Barriers and complying with the local Building Code, all other by-laws of the municipality and all other authorities having jurisdiction.

## 1.4 PROTECTION

- .1 Provide temporary protection to construction as required by the Work, to protect it from damage.
- .2 Box with wood or otherwise protect from damage, by continuing construction, finished sills, jambs, corners, and the like.
- .3 Adequately protect the Work at all stages of operations and maintain protection until the Work is completed. Remove and replace, at no additional cost to Owner, damaged Work and materials that cannot be repaired or restored to the approval of the Consultant.
- .4 Provide spare safety helmets for and enforce their use by Owner, Consultants, and representatives and authorized visitors to the site.
- .5 In addition to requirements of authorities having jurisdiction, provide temporary protection and safeguards adequate to protect against:
  - .1 Accident or injury to workers and other persons on the site or adjacent work and properties.

- .2 Damage to any part of the Work and to any adjoining or adjacent structure, property, services, and other similar items, by overloading, weather, frost, any other cause resulting from the execution of the Work.
- .3 Protect work, existing property, adjacent tenant and public property from damage during performance of Work. Should any part of the Work or any buildings, services or similar items on or surrounding the areas of the work and adjacent to any road leading thereto become damaged or disfigured due to lack or failure of such protection, they shall be made good with material identical with the existing and adjoining surfaces, to the satisfaction of the authorities having jurisdiction and the Owner.
- .4 Damaged work shall be made good by those performing work originally, or workers experienced or skilled in that particular type of work, at expense of those causing damage.
- .5 Provide and maintain necessary temporary enclosures, hoardings, fences, gates, barriers, guards, hoists, cranes, stairs, ladders and scaffolding, walks, platforms, staging as necessary for the Work and protection of workers, public and others from injury, and for public access to adjacent buildings. All such apparatus shall meet requirements of the authorities having jurisdiction.
- .6 Provide secure, rigid guard railings, hoardings and barricades around openings, as required by authorities having jurisdiction and to maintain safety.
- .7 Provide proper guard devices, signs, signals and lights for the prevention of accidents.
- .8 Maintain at night, sufficient and suitable warning lights to prevent accidents and injuries to persons and/or property.
- .9 Alter, remove and relocate or replace hoardings, barriers and entrances as required by the Work. Hazards requiring such protection shall be eliminated as soon as possible and protection devices removed. Maintain protection until state of construction allows their removal.
- .10 Provide and maintain temporary weathertight protection for all exterior openings in walls, floors and roofs until the building is closed in.
- .11 Close off floor areas where walls are not finished, seal off openings and enclose building interior work area. Polyethylene or other approved translucent material shall be framed in or around wall openings. Provide temporary doors, frames, hinges, locks, keys and bolts as required.
- .12 Should the work be stopped for any cause, provide protection and bracing for the Work.
- .6 Lay protective 13mm (1/2") plywood over completed areas of roof on which other trades are to work.

## **1.5 FIRE SAFETY REQUIREMENTS**

- .1 Comply with fire and safety regulations required by the authorities having jurisdiction.
- .2 Take necessary precautions to eliminate fire hazards and to prevent damage to Work, building materials, equipment and other property both public and private having to do with Work. Inspect Work at minimum weekly intervals for this purpose. Do not store combustible materials near or next to occupied areas of the building, or next to exit pathways.
- .3 Store and locate products and equipment packed in cardboard cartons, wood crates and other combustible containers in orderly and accessible manner.
- .4 Tarpaulins shall be fire-resistant.
- .5 Open fires and burning of rubbish are not permitted on the site.
- .6 Provide and maintain in working order, ULC labelled fire extinguishers or other approved fire extinguishing equipment, locate in prominent positions, in accordance with requirements of authorities having jurisdiction and insurance companies having jurisdiction, codes, regulations and bylaws in the building until the permanent fire protection system in the building is available.

- .7 Provide temporary standpipe system, when required by authorities having jurisdiction.
- .8 Except as otherwise specified herein, soldering, welding and cutting operations shall be carried out in areas free of combustible and flammable contents, with walls, ceilings and floors of noncombustible construction or lined with noncombustible materials.
- .9 When it is not practicable to undertake welding, soldering and cutting operations in areas described in the previous paragraph, combustible and flammable materials shall either be removed minimum of 9144mm (30') from the work area or otherwise protected against ignition by sheet metal or other noncombustible material.
- .10 When welding, soldering, or cutting is to be carried out near piping containing flammable gas, the section of piping located within 914mm (3') of the torch or other source of combustion shall be covered with wet, noncombustible insulating material at least 6mm (1/4") thick.
- .11 Prior to initiating any open flame work or welding operation, discuss the proposed work with the Consultant and take necessary precautions to prevent inadvertent activation of the existing fire alarm system. Have sufficient suitable hand operated fire extinguishers on hand near the work area. Ensure that an additional person is readily available to operate fire extinguishers should the need arise.

#### **1.6 PERSONAL HEALTH AND SAFETY REQUIREMENTS**

- .1 Comply with all requirements of the Occupational Health and Safety Act, Ministry of Labour, Construction Safety Association and all other authorities having jurisdiction in the place of the Work.
- .2 Contractor shall submit company safety policy for review by Owner and Consultant. The policy must meet or exceed the requirements of the authorities having jurisdiction.
- .3 Contractor shall employ and pay for services of safety supervisor in accordance with the requirements of the authorities having jurisdiction. Safety supervisor shall have training with the Construction Safety Association.
- .4 Alcohol and/or drugs will not be allowed on the site. Anyone found in possession of alcohol and/or drugs shall be dismissed from the site immediately and without notice, maybe subject to civil and/or criminal proceedings.
- .5 WHMIS program shall be fully enforced.
- .6 Contractor shall be prepared to sign the "Guidelines For The Structure and Function Of The Joint Occupational Health and Safety Committee", if requested by the Owner.
- .7 When carrying out soldering, welding or cutting procedures, be it in shop or in the field, ensure that workers comply with the following:
  - .1 Wear appropriate protective clothing such as gloves, leather aprons and/or arm spark guards.
  - .2 Wear suitable goggles or face shields as appropriate.
  - .3 Protect co-workers from eye or other injuries through the use of fire resistant portable shielding devices.
  - .4 Provide and use a portable fume eliminator at all times during welding, soldering, or cutting operations within the existing building.

#### **1.7 SECURITY**

- .1 Maintain security of construction site by control of access through enclosing barricades, and hoardings during times work is in progress, and by locking hardware.
- .2 Properly close and lock the construction site at nights, Sundays, holidays and other occasions when the Work is not in progress.
- .3 The Owner assumes no responsibility for the safeguarding of tools or equipment from theft.

- .4 Take precautions to guard construction site, premises, materials and the public during and after working hours. During regular working hours, maintain watch to guard construction site and contents.
- .5 Maintain security at all times if construction is shut down because of a strike or a lockout.
- .6 Provide security guards and security lighting during all after hour work.
- .7 Provide personnel to direct traffic as required during working hours.

#### **1.8 ACCESS ROADS, WALKS AND PARKING**

- .1 Access Roads and Walks:
  - .1 All construction vehicles and personnel required for construction shall use existing access roads and walks as determined at later date by Owner. When no longer required, or at completion of Work, make good disturbed surfaces. Maintain roads and walks, removing dirt, mud, debris, ice, snow and other obstructions during use.
  - .2 Provide for access of emergency vehicles at all times.
- .2 Parking:
  - .1 Parking for Contractor's, subcontractors, suppliers and/or their employee's vehicles shall be limited to restricted area as designated by the Owner.
  - .2 The Owner, property management and their employees will not be responsible for parking fines incurred by the Contractor, Subcontractors, suppliers and/or their employees.

#### **1.9 SITE SIGNS**

- .1 No signs, bills or posters will be allowed on the site, other than site signs as follows:
  - .1 Project construction sign shall be supplied and installed by Owner under work of separate Contract.
  - .2 Place only specified project construction sign and notices regarding safety, caution, or instructions on or near site.
  - .3 No unauthorized signs, bills, posters or advertisements of any kind are permitted. Should such unauthorized advertisements be applied to the temporary hoarding by the public or anyone else, upon discovery of such, the Contractor shall remove them on a weekly basis.
  - .4 Erect all notices as directed by Owner.
  - .5 Remove all notices on completion of the Contract.

#### **1.10 FIELD OFFICES AND SHEDS**

- .1 Field Offices:
  - .1 Provide temporary offices for Owner's, Consultant's and Contractor's use. They shall contain facilities as required for Contractor, a conference table and chairs for site meetings, and facilities for the Owner and the Consultants.
  - .2 Temporary field offices shall be designated on site until such time where an area located inside the constructed building, can be designated by the Owner. No other location shall be used for temporary field office. Temporary site office shall not exceed 3048mm (10') x 15240mm (50').
  - .3 Facilities shall consist of: an office desk and chair, a two drawer filing cabinet, two chairs, use of a telephone, use of facsimile machine, and a layout table for drawings located so that when drawings are spread out their orientation is same as that of building under construction.
  - .4 Heat, cool and light offices to minimum code requirements for office buildings.

- .5 Keep temporary field office clean and remove all rubbish at the end of each work day.
- .6 Include construction and operating hardware, with security locks, as required by the Owner.
- .2 Site Storage:
  - .1 Until such time where an area can be located inside the constructed building, designated by the Owner as a temporary site storage, provide storage trailers or construct weather-tight storage sheds for storage of materials that may be damaged or defaced by weather, in locations indicated by the Owner.
  - .2 Provide floors raised 150 mm (6") clear of ground for storage of Products.
  - .3 Include security locks, as required.
  - .4 Install lighting in storage areas and heat in those storage areas containing materials damaged by low temperature.
  - .5 Provide separate shed located where directed in writing by Consultant for storage of volatile materials.
  - .6 Owner is not responsible for securing Products or materials at the Place of the Work.
  - .7 Handle and store materials so as to prevent damage or defacement to the Work and surrounding property.

#### 1.11 DUST CONTROL

- .1 Provide dust tight screens or barriers to localize dust generating activities for the protection of tenants, employees, equipment, adjacent and finished areas of Work, and the public. Maintain and relocate protection until Work is complete. Respond immediately to complaints of dust received from the public, authorities having jurisdiction, Owner and Consultant.
- .2 Obtain Consultant's approval of installed dustproof screens and protection methods before proceeding with construction/alteration work.
- .3 Painted gypsum wallboard and metal stud dustproof screens, shall extend to underside of structure, and shall be erected to protect adjoining areas and rooms. Apply bead of sealant or other acceptable seal continuously around periphery of each face of partitioning to seal gypsum board/structure junction where dustproof screens abut fixed building components. Seal perimeter of cutouts, around fixtures and fittings and other penetrations. Tape or seal between adjacent boards. Separate construction areas from occupied areas.
- .4 Provide protection for existing equipment sensitive to dust and noise. Prevent dust migration through HVAC or return air systems.
- .5 Co-ordinate location of dust barriers and dust tight doors with Consultant.
- .6 Install temporary packing at bottom of doors to areas where demolition/construction shall be performed to prevent dust seepage into existing spaces. Do not permit dust and dirt to escape beyond area being constructed/altered.
- .7 Provide daily vacuuming of construction dust from existing areas as work progresses; this shall be considered a minimum requirement, increase vacuuming as necessary. The Owner may have vacuuming work done by others and cost deducted from Contractor's progress payments if this requirement is not fulfilled.
- .8 Provide locked doors in barriers to permit access by Consultant, Owner and Owner's security personnel to construction areas and to areas under Contractor's custody. Supply padlocks and construction cores.
- .9 Remove dustproof screens at completion of work in areas and make good damaged or blemished areas. Patch and make good to access, altered and damaged areas caused by work and screens. Maintain integrity of fire or sound separation.

- .10 Prevent nuisance to adjacent areas near the work from dust by taking additional appropriate anti-dust measures at such times as found necessary, and at other times complaints of dust are received from the Owner's representative and others.

**1.12 NOISE AND VIBRATION CONTROL**

- .1 Take measures to control noise and vibration generated by the Work.
- .2 Take appropriate noise and vibration control measures at times found necessary, and at other times complaints of noise are received from the public, authorities having jurisdiction, Owner and Consultant.
- .3 These requirements are for the consideration of the public, tenants and employees. Requirements shall not be construed as cause for elimination or restriction of Contractor's working schedule, claims for delay of work nor additional costs.

**1.13 PEST CONTROL**

- .1 Provide rodent control and other pest control programs during the Work in accordance with the requirements of authorities having jurisdiction.

**1.14 FIRES**

- .1 Open burning fires on site will not be permitted.

**1.15 FIRST AID SERVICES**

- .1 Provide and maintain First Aid services as required by the authorities having jurisdiction, the Workplace Safety and Insurance Board (WSIB) and Union Agreements.

**1.16 ENVIRONMENTAL/POLLUTION CONTROL/SITE CLEANING**

- .1 Prevent the escape of untreated effluent, be it liquid or gaseous substance or any liquid or solid wastes, being objectionable or detrimental to adjoining areas of the construction site.
- .2 Burning or burying of rubbish, waste, and the like is not permitted on construction site.
- .3 Only fires for heating bitumen and temporary heaters as specified are permitted on site.
- .4 Take care to prevent staining or smoke damage to structure or materials. Replace stained or damaged work.
- .5 Make every effort to provide environmental protection, take precautionary measures to prevent excessive noise, sounds, vibrations, dust, air pollution, smoke, etc., which may become objectionable to people occupying adjacent areas.
- .6 Keep building site clean and free of unsightly collection of waste materials and debris. Provide for temporary storage and collection of waste materials, and dispose to local authorities having jurisdiction recommendations at intervals to maintain a clean site condition.
- .7 Confine apparatus, the storage of materials and the operations of workers to the site. Do not unreasonably encumber the premises with construction materials.

2 Products

**Not Used**

3 Execution

**Not Used**

**END OF SECTION**

1 General

**1.1 SECTION INCLUDES**

- .1 Requirements for temporary hoarding.

**1.2 PERMITS**

- .1 Arrange and pay for necessary permits for proper execution and completion of the work of this section.

**1.3 SUBMITTALS**

- .1 Shop Drawings:
  - .1 Submit shop drawings for temporary barriers and enclosures in accordance with Section 01 33 00.
  - .2 Clearly indicate details of construction, profiles, jointing, fastening and other related details.

**1.4 HOARDING DESIGN**

- .1 Design hoarding to meet bylaws and regulations of authorities having jurisdiction and obtain approvals from authorities having jurisdiction.
- .2 Location and types of hoarding as indicated on Drawings.

2 Products

**2.1 HOARDING MATERIALS**

- .1 Plywood Hoarding:
  - .1 Provide rough hardware required for the work of this section.
  - .2 Framing lumber and posts: Unless otherwise specified or indicated, NLGA No. 2 Construction SPF.
  - .3 Reused material may be used.
  - .4 Dimensions as follows, unless otherwise indicated or required by authorities having jurisdiction:
    - .1 Vertical posts: 89mm x 89mm (3-1/2" x 3-1/2").
    - .2 Horizontal rails: 39mm x 89mm (1-1/2" x 3-1/2").
    - .3 Hoarding: Plywood, 1220mm x 2440mm x 13mm thick (4' x 8' x 1/2"), sheathing grade conforming to CSA 0141-M1978.
    - .4 Reused material may be used.
    - .5 Hoarding to be painted in accordance with Section 09 90 00. Colour: As selected by the Consultant.

3 Execution

**3.1 HOARDING FABRICATION**

- .1 Provide hoarding immediately upon award of Contract.



- .2 Erect framing members and install hoarding panels at the perimeter of the Place of the Work as indicated or required by authorities having jurisdiction to fully enclose the Place of the Work and as follows, unless otherwise indicated or required by authorities having jurisdiction:
  - .1 Height of hoarding: 2440mm (8') minimum, unless otherwise indicated, above grade at any point.
  - .2 Vertical posts spaced 2440mm (8') on centre, maximum.
  - .3 Horizontal rails securely nailed or screwed to vertical posts at top, bottom, and intermediate locations at 610mm (24") on centre.
  - .4 Erect panels around objects as required.
  - .5 Hoarding shall contain no opening more than 100mm (4") wide or less than 914mm (3') above the bottom of the fence except where required for access to and from the Place of the Work.
  - .6 Provide no rails, other horizontal or diagonal bracing, attachments, or pattern of openings on the outside that would facilitate climbing.
- .3 Provide hoarding, access doors, in conformance with the Contract Documents and authorities having jurisdiction.
- .4 Hoarding hardware: Provide rough and finish hardware as required.

### **3.2 DESIGN AND SAFETY REQUIREMENTS FOR TEMPORARY WORK**

- .1 Be responsible for design, erection, operation, maintenance and removal of temporary structural and other temporary facilities, barriers, and enclosures.
- .2 Engage and pay for registered professional engineering personnel skilled in the appropriate disciplines to perform these functions where required by law or by the Contract Documents; and in cases where such temporary facilities and their method of construction are of such a nature that professional engineering skill is required to produce safe and satisfactory results.
- .3 Engage and pay for professional engineer(s) registered in Place of the Work to design and supervise construction and maintenance of hoardings, covered ways, protective canopies and project sign(s). Designs provided by Consultant or Owner for such work cover general appearance only.

**END OF SECTION**

1 General

**1.1 GENERAL**

- .1 Products refer to materials, manufactured components and assemblies, fixtures and equipment incorporated in the work.
- .2 As far as practical, favour use of products of Canadian manufacture unless such products are not manufactured in Canada, are specified otherwise, or are not competitive.
- .3 Products for use in the Project and on which the Bid was based shall be in production at time of tender date, with a precise model and shop drawings available for viewing.
- .4 Where equivalent products are specified, or where alternatives are proposed, these products claimed by the Contractor as equivalent shall be comparable in construction, type, function, quality, performance, and, where applicable, in appearance. Where specified equivalents are used in the Stipulated Price for the work, they shall be subject to final approval.
- .5 Incorporate products in the work in strict accordance with Manufacturers' directions, instructions and specifications, where reference is made to them, shall include full information on storing, handling, preparing, mixing, installing, erecting, applying, and other matters concerning the materials that are pertinent to their use and their relationship to materials with which they are incorporated.
- .6 Products delivered to the Project site for incorporation in the work shall be considered the property of the Owner. Maintain protection and security of products stored on the site after payment has been made for them.
- .7 Do not install permanently incorporated labels, trademarks and nameplates, in visible locations unless required for operating instructions or by authorities having jurisdiction.

**1.2 PRODUCT HANDLING**

- .1 Manufacture, pack, ship, deliver and store products so that no damage occurs to structural qualities and finish appearance, nor in any other way detrimental to their function or appearance, or both.
- .2 Ensure that products, while transported, stored or installed, are not exposed to an environment which would increase their moisture content beyond the maximum specified.
- .3 Schedule early delivery of products to enable work to be executed without delay. Before delivery, arrange for receiving at site.
- .4 Deliver and store products at site where directed by the Contractor.
- .5 Brace work such as door frames, large window units and similar products to prevent distortion or breakage in handling.
- .6 Deliver packaged products, and store until use, in original unopened wrapping or containers, with manufacturer's seals and labels intact.
- .7 Label packaged products to describe contents, quantity and other information as specified.
- .8 Label fire-rated products to indicate approval of Underwriters' Laboratories.
- .9 Product handling requirements may be repeated, and additional requirements specified, in other Sections.

**1.3 STORAGE AND PROTECTION**

- .1 Store products on site with secure protection against all harmful environmental conditions. Prevent damage, adulteration, staining and soiling of materials while stored.
- .2 Protect prefinished metal surfaces by protective coatings or wrappings until time of final cleanup specified in Section 01 77 19. Protection shall be easily removable under work of Section 01 77 19 without damage to finishes.

- .3 Store manufactured products in accordance with manufacturers' instructions.
- .4 Store steel, lumber, masonry units, and similar products on platforms raised clear of ground.
- .5 Store finished products and woodwork under cover at all times.
- .6 Do not store products at locations or in such a manner that they damage previously completed work.
- .7 Storage and special protection requirements may be repeated and additional requirements specified, in other Sections.

#### **1.4 SCHEDULING OF PRODUCT DELIVERY**

- .1 Verify that products supplied by all Sections are ordered from suppliers in sufficient time to ensure delivery for incorporation in the work within the time limits established by approved construction schedule.
- .2 Obtain confirmed delivery dates from product suppliers.
- .3 Immediately inform the Consultant should supplier's confirmation of delivery dates indicate that Project completion may be delayed.
- .4 Submit copies of purchase orders and confirmations of delivery dates for products as may be requested.
- .5 A schedule of product delivery shall be established and reviewed at each job site meeting.
- .6 When deemed necessary, plant visits shall occur by the General Contractor to ensure delivery dates given are true and accurate.

#### **1.5 DEFECTIVE PRODUCTS AND WORK**

- .1 Products and work found defective; not in accordance with the Specifications; or defaced or injured through negligence of the Contractor, his employees or Subcontractors, or by fire, weather or any other cause will be rejected for incorporation in the work whether or not incorporated in the work.
- .2 Remove rejected products and work from the premises immediately.
- .3 Replace rejected products and work with no delay after rejection. Provide replacement products and execute replacement work precisely as required by the Specifications for the defective work replaced. Previous inspection and payment shall not relieve the Contractor from the obligation of providing sound and satisfactory work in compliance with the Specifications.
- .4 Testing and retesting of any part of the work as directed by the Owner, Consultant or Contractor to establish its conformance to the Contract Documents shall be performed at no addition to the Contract Price.

#### **1.6 WORKERS, SUPPLIERS AND SUBCONTRACTORS**

- .1 Assign work only to workers, suppliers, and Subcontractors who have complete knowledge, not only of the conditions of the Specifications, but of jurisdictional requirements, and reference standards and specifications.
- .2 Give preference to use of local workers, suppliers and Subcontractors wherever possible.
- .3 Certified and qualified installers of a specific product line shall be used when called for in these Specifications.

### **2 Products**

#### **2.1 SPECIFIED PRODUCTS**

- .1 Products used for temporary facilities may have been previously used, providing they are sound in structural qualities.

- .2 Specified Options: The Work is based on materials, Products and systems specified by manufacturer's catalogued trade names, references to standards, by prescriptive specifications and by performance specifications.
  - .1 Where only one manufacturer's catalogued trade name is specified for a Product, the Product is single sourced and shall be supplied by the specified manufacturer.
  - .2 Where more than one manufacturer's catalogue trade name is specified for a Product, supply the Product from any one of those manufacturers specified.
  - .3 When a Product is specified by reference to a standard, select any Product from any manufacturer that meets or exceeds the requirements of the standard.
  - .4 When a Product or system is specified by prescriptive or performance specifications, Provide any Product or system which meets or exceeds the requirements of the prescriptive or performance specifications.
  - .5 The onus is on the Contractor to prove compliance with governing published standards, prescriptive specifications and with performance specifications.
- .3 Products, materials, equipment and articles (referred to as Products throughout the Contract Documents) incorporated in the Work shall be new, not damaged or defective, and of the quality standards specified, for the purpose intended. If requested, furnish evidence as to type, source and quality of Products Provided.
- .4 Where Contract Documents list acceptable Products or acceptable manufacturers, select as applicable, any one Product from any one manufacturer meeting performance of specifications.
- .5 Where Contract Documents require design of a Product or system, and minimum material requirements are specified, the design of such Product or system shall employ materials specified within applicable section. Where secondary materials or components are not specified, augment with materials meeting applicable code limitations, and incorporating compatibility criteria with adjacent work.
- .6 Defective Products, whenever identified prior to completion of the Work, will be rejected, regardless of previous reviews. Review of the Work by the Consultant or inspection and testing companies does not relieve the Contractor of the responsibility for executing the Work in accordance with the requirements of the Contract Documents, but is a precaution against oversight or error. Remove and replace defective Products and be responsible for delays and expenses caused by rejection at no additional cost to the Owner.
- .7 Should any dispute arise as to quality or fitness of Products, the decision rests strictly with Consultant based upon the requirements of the Contract Documents.
- .8 Unless otherwise indicated in the Contract Documents, maintain uniformity of manufacturer for any like item, material, equipment or assembly for the duration of the Work.
- .9 Products exposed in the finished work shall be uniform in colour, texture, range, and quality, and be from one production run or batch, unless otherwise indicated.
- .10 Permanent labels, trademarks and nameplates on Products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical, electrical, machinery or like rooms.
- .11 Owner retains right to select from choices available within specified Products for colours, patterns, finishes or other options normally made available. Submit full range of Product options in accordance with 01 33 00 for such selection.
- .12 Quality Control:
  - .1 Implement a system of quality control to ensure compliance with Contract Documents.
  - .2 Notify Consultant of defects in the Work or departures from intent of Contract Documents that may occur during construction. Consultant will recommend appropriate corrective action in accordance with requirements of the Contract.

3 Execution

**3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Unless otherwise indicated in the Contract Documents, install or erect Products in accordance with manufacturer's printed instructions. Do not rely on labels or enclosures supplied with Products. Obtain printed instructions directly from manufacturers.
- .2 Notify Consultant in writing, of conflicts between the Contract Documents and manufacturer's instructions.
- .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 additional cost to the Owner.
- .4 Manufacturers' representatives shall have access to the Work at all times. Contractor shall render assistance and facilities for such access in order that the manufacturers' representatives may properly perform their function.

**3.2 GALVANIC/DISSIMILAR METAL CORROSION**

- .1 Insulate dissimilar metals from each other by suitable plastic strips, washers or sleeves to prevent galvanic corrosion where conductive liquid or electrolyte exists.

**3.3 WORKMANSHIP**

- .1 General:
  - .1 Execute the Work using workers experienced and skilled in the respective duties for which they are employed.
  - .2 Do not employ an unfit person or anyone unskilled in their required duties.
  - .3 Decisions as to the quality or fitness of workmanship in cases of dispute rest solely with Consultant, whose decision is final.
  - .4 Upon request by the Consultant, submit proof, in the form of CCDC 11 - Contractor's Qualification Statement, of qualifications of Subcontractors to verify Subcontractor's qualifications and experience meet or exceed the requirements of the Contract Documents.
    - .1 If, upon review of the Contractor's Qualification Statement, it is found that the Subcontractor does not meet the qualification requirements specified in the Contract Documents pertaining to the parts of the Work for which the Subcontractor has been retained, the Contractor shall replace the unqualified Subcontractor with a qualified Subcontractor, satisfactory to the Contractor and the Owner, at no additional cost to the Owner and at no increase in the Contract Time.
- .2 Coordination:
  - .1 Ensure cooperation of workers in layout of the Work. Maintain efficient and continuous supervision.
  - .2 Be responsible for coordination and placement of openings, sleeves and accessories.
- .3 Cutting and Remedial Work:
  - .1 Perform cutting and remedial work required to make parts of the Work come together. Coordinate the Work to ensure this requirement is maintained. Obtain permission from Consultant before commencing any cutting.
- .4 Fastenings:
  - .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
  - .2 Prevent electrolytic action and corrosion between dissimilar metals and materials.

- .5 Protection of work in progress:
  - .1 Take reasonable and necessary measures, including those required by authorities having jurisdiction, to Provide protection.
  - .2 Adequately protect parts of the Work completed or in progress. Parts of the Work damaged or defaced due to failure in providing such protection is to be removed and replaced, or repaired, as directed by the Consultant, at no additional cost to the Owner.
  - .3 Do not cut, drill or sleeve any load bearing structural member without written permission of Consultant, unless specifically indicated.
  - .4 Keep floors free of oils, grease or other materials likely to discolour them or affect bond of applied surfaces.
  - .5 Protect work of other Subcontractors from damage while doing subsequent work. Damaged work shall be made good by appropriate Subcontractors but at expense of those causing damage.
  - .6 Protect existing buildings, curbs, roads and lanes. If, during the Work, any buildings, curbs, roads or lanes are damaged, bear costs for repairs.
- .6 Existing Utilities:
  - .1 When breaking into or connecting to existing services or utilities, execute the Work at times approved by Owner, with a minimum of disturbance to Owner's ongoing operations, the Work, and traffic.
  - .2 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in a manner approved by authority having jurisdiction and stake or otherwise record location of capped service.
- .7 Operational requirements: Operable Products shall be Provided fully operational and ready for intended use.

**END OF SECTION**

1 General

**1.1 GENERAL INSTRUCTIONS**

- .1 The procedures for completing Contract and acceptance by the Owner shall be in accordance with the methods prescribed by Owner.
- .2 Stages will be reviewed at the Contract start-up meeting to ensure that parties understand their responsibilities. Refer to Section 01 31 19 for procedures and requirements for Contract start-up meeting.
- .3 Within four (4) weeks of commencement of the Work, submit to the Consultant a list of closeout submittals required by the Contract Documents.
- .4 Note that entities other than the Owner may be involved in the closeout procedures described herein, including attendance at any operation and/or maintenance training sessions required. The Owner will coordinate such attendance as required.
- .5 Comply with recommended takeover procedures contained in OAA/OGCA Document No. 100, except as modified by Contract Documents.

**1.2 FINAL CLEANING**

- .1 Co-ordinate final clean-up with the Owner's representatives and opening requirements.
- .2 In addition to requirements for cleaning-up specified in the General Conditions of the Contract, and in Section 01 11 00, include in work final cleaning by skilled cleaning specialists on completion of construction.
- .3 Remove temporary protections and make good defects before commencement of final cleaning.
- .4 Replace glass and mirrors that have been broken, damaged and/or etched during construction, or which are otherwise defective.
- .5 Remove dust, stains, paint spots, soil, grease, fingerprints, and accumulations of construction materials, interior and exterior to the building. Perform cleaning in accordance with installer's instructions for each material. Final cleaning shall include:
  - .1 Washing of interior concrete floors.
  - .2 Cleaning and polishing of:
    - .1 glass;
    - .2 mirrors;
    - .3 porcelain, enamel, and finish metals;
    - .4 washroom accessories.
  - .3 Vacuum cleaning of ceilings, walls and floors.
  - .4 Cleaning of glazed wall surfaces.
  - .5 Cleaning of hardware, mechanical fixtures, lighting fixtures, cover plates, and equipment, including polishing of their finish metal, porcelain, vitreous, and glass components.
  - .6 Removing of visible labels left on materials, components, and equipment.
  - .7 Maintain cleaning until Owner has taken possession of building or portions thereof.

**1.3 CLOSE-OUT SUBMITTALS**

- .1 Collect reviewed submittals, and assemble required closeout submittals executed by Subcontractors, Suppliers, and manufacturers. Prior to submitting closeout submittals to the Consultant, undertake the following:
  - .1 Review maintenance manual contents (operating, maintenance instructions, as built drawings, materials) for completeness.

- .2 Review in relation to Contract Price, Change Orders, Change Directives, holdbacks and other adjustments to the Contract Price.
  - .3 Review inspection and testing reports to verify conformance to intent of Contract Documents and that changes, repairs or replacements have been completed.
  - .4 Execute transition of performance bond and labour and materials payment bond to warranty period requirements.
  - .5 Submit a final statement of accounting giving total adjusted Contract Price, previous payments, and monies remaining at time of application for completion of the Contract. Consultant will issue a final change order reflecting approved adjustments to Contract Price not previously made, if any.
- .2 No later than then (10) working days prior to submitting request for Consultant's review to determine if Substantial Performance of the Work has been achieved, submit to the Consultant the closeout submittals specified in this section, including, but not limited to, reviewed shop drawings, Product data sheets, samples, operating instructions, as-built records, and fully executed warranties and guarantees.
  - .3 For items of the Work delayed materially beyond date of Substantial Performance of the Work, provide updated closeout submittals within ten (10) working days after acceptance, listing date of acceptance as start of warranty period.
  - .4 Neither the Consultant's review to determine if Substantial Performance of the Work has been achieved, nor acceptance of the Work, will take place until receipt, by the Consultant, of acceptable copies of the closeout submittals required herein and by the Contract Documents.
  - .5 As-built records and operation and maintenance manuals, as indicated in Section 01 33 00.
  - .6 Maintenance materials:
    - .1 Deliver to a location and at a time specified by the Owner, organize items in Owner's storage area as directed by the Owner, and as follows:
      - .1 Use unbroken cartons, or if not supplied in cartons, material shall be strongly packaged.
      - .2 Clearly mark cartons or packaging as to contents, project name, and Supplier.
      - .3 If applicable give colour and finish, room number or area where material is used.
    - .2 Replace incorrect or damaged maintenance materials delivered to Owner, including damage through shipment.
    - .3 Provide a typed inventory list of maintenance materials prior to Substantial Performance of the Work application. List all items, complete with quantities, and storage locations.
    - .4 Establish a master list identifying maintenance materials and maintain a log of when materials are turned over to Owner and signing authority for acceptance of materials on behalf of Owner. Master list and log shall be in a format acceptable to the Owner.
  - .7 Owner communication material:
    - .1 Deliver Owner communication material that was applied to hoarding and/or temporary barriers and enclosures during the Work. Salvage such material in accordance with Section 01 11 00.

#### 1.4 SUBSTANTIAL PERFORMANCE OF THE WORK

- .1 Deficiency review:
  - .1 Neither Owner nor Consultant will be responsible for preparation or issuance of extensive lists of deficiencies. Contractor assumes prime responsibility for ensuring that items shown and described in the Contract Documents are complete. Any reviews to approve the certificate of Substantial Performance of the Work will be immediately cancelled if it becomes obvious to the Consultant that extensive deficiencies are outstanding.



- .2 The Contractor shall conduct an inspection of the Work to identify deficiencies and defects, which shall be repaired. When the Contractor considers that the Work is substantially performed, the Contractor shall prepare and submit to the Consultant a comprehensive list of items to be completed or corrected and apply for a review of the Work by the Consultant to determine if Substantial Performance of the Work has been achieved.
- .3 The Contractor's request described above shall include a statement by Contractor that the Work to be reviewed by Consultant for deficiencies is, to the best of the Contractor's knowledge, in compliance with Contract Documents, reviewed shop drawings, and samples, and that deficiencies and defects previously noted by Consultant have been repaired.
- .4 No later than fifteen (15) working days after the receipt of the Contractor's request described above, but contingent upon the prior receipt, by the Consultant, of the closeout submittals in the manner and form specified in this section, the Consultant and the Contractor will review the Work to identify any defects or deficiencies. If necessary, the Contractor shall tabulate a list of deficiencies to be corrected prior to Substantial Performance of the Work being certified by the Consultant.
- .5 During review, the Consultant and the Contractor will decide which deficiencies or defects must be rectified before Substantial Performance of the Work can be certified, and which defects are to be treated as warranty items.
- .6 Provide a schedule of planned deficiency review having regard to the foregoing.
- .2 Certification of Substantial Performance of the Work:
  - .1 When the Consultant considers that the deficiencies and defects have been completed and that it appears that the requirements of the Contract Documents have been substantially performed, the Consultant shall issue a certificate of Substantial Performance of the Work to the Contractor, stating the date of Substantial Performance of the Work.
  - .2 The certificate of Substantial Performance of the Work shall be prepared in form required by Construction Lien Act.
- .3 Final Inspection for completion of the Contract:
  - .1 Deficiencies and defects shall be made good before the Contractor submits a written request for final review of the Work and before the Contract is considered complete.
  - .2 When Contractor is satisfied that the Work is complete, and after the Contractor has reviewed the Work to verify its completion in accordance with the requirements of the Contract Documents, the Contractor shall submit a written request for a final review by the Consultant, who in turn will notify the Owner.
  - .3 If there are any deficiencies identified as a result of this review, they shall be listed by the Consultant and submitted to the Contractor. This list shall be recognized as the final deficiency list for purposes of acceptance of the Work under the Contract.
  - .4 Such deficiencies shall be corrected by a date mutually agreed upon between Consultant and the Contractor, unless a specific date is required by Contract, and a further review by the Consultant shall be called for by the Contractor following his own review to take place within seven (7) days from date of request.
  - .5 Contractor shall thereafter submit invoice for final payment.
  - .6 Money shall be withheld for deficiency work and will be released only when all deficiencies have been completed. No partial payment to be recognized until all work is completed.
- .4 If the Contractor needs to return to the Place of the Work to complete deficiencies after the Owner has taken possession, the Contractor shall provide the Owner with a minimum of one (1) week's prior notice of such requirement.

**1.5 WARRANTY PERIOD**

- .1 Provide on-going review and attendance to call-back, maintenance and repair problems during the warranty periods.
- .2 At the beginning of the 12th month after Substantial Performance of the Work, the Owner, Contractor and Consultant, along with key Subcontractors as designated, shall carry out a complete review of the built project to determine which deficiencies are to be rectified under the warranty.
- .3 Contractor shall be responsible for timely written notification of Owner, and Consultant a minimum of three (3) months prior to such end of warranty period inspection and any delay in such notification shall extend such warranty period until proper notification is received by Owner, and Consultant.

2 Products

**Not Used**

3 Execution

**Not Used**

**END OF SECTION**

1 General

**1.1 WARRANTIES**

- .1 Warranties shall be in accordance with the General Conditions, as amended, and as follows:
  - .1 Warranties shall commence at date of Substantial Performance of the Work.
  - .2 Submit warranties for applicable items, signed by the applicable company responsible for each warranty.
  - .3 Submit warranties on form approved by Owner including, but not limited to, the following information:
    - .1 Name and address of Project.
    - .2 Warranty commencement date (date of Substantial Performance of the Work).
    - .3 Duration of warranty.
    - .4 Clear indication of what is being warranted and what remedial action will be taken under warranty.
    - .5 Authorized signature and seal of company providing each warranty.
  - .4 Owner shall be named in manufacturer's Product warranties. Submit on relevant Product manufacturer's standard warranty or guarantee form.

2 Products

**Not Used**

3 Execution

**Not Used**

**END OF SECTION**

1 General

**1.1 SUMMARY**

- .1 Review drawings, site conditions, and other specification sections to ascertain the extent and nature of work of this section.
- .2 The Work of this Section includes, but is not limited to the following:
  - .1 Demolish and removal of the following where indicated on the Drawings:
    - .1 Office partitions;
    - .2 Concrete block walls;
    - .3 Floor and wall finishes;
    - .4 Doors, frames and associated hardware.
  - .2 Disconnect/cap existing service in areas of demolition.
  - .3 Trace, demolish and remove decommissioned mechanical and electrical services found during demolition. Remove decommissioned services to the area of demolition to the source, leaving no buried services in walls and floors, unless otherwise approved by written notice from the Owner.
  - .4 Dispose of demolished materials except where required to be salvaged or reused.
  - .5 Refer to demolition notes indicated on all disciplines Drawings.
- .3 Drawings contain details that suggest directions for solving some of the major demolition and removal requirements for this project; Contractor is required to develop these details further by submitting a demolition plan prepared by a professional engineer employed by the Contractor.

**1.2 RELATED REQUIREMENTS**

- .1 Section 05 50 00: Miscellaneous Metals
- .2 Section 06 10 00: Rough Carpentry
- .3 Section 09 21 16: Gypsum Wallboard

**1.3 REFERENCE STANDARDS**

- .1 American National Standards Institute (ANSI):
  - .1 ANSI A10.8-2011, Scaffolding Safety Requirements
- .2 Canadian Standards Association (CSA):
  - .1 CSA S350- M1980 (R2003), Code of Practice for Safety in Demolition of Structures.
- .3 National Fire Protection Association (NFPA):
  - .1 NFPA 241-09, Standard for Safeguarding Construction, Alteration, and Demolition Operations
- .4 Provincial Legislation:
  - .1 Legislation specific to Authority Having Jurisdiction for work governed by this Section.

**1.4 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 Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- .3 Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

- .4 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed, removed and salvaged, or removed and reinstalled.

#### **1.5 EXAMINATION**

- .1 Visit and examine the site and note all characteristics and irregularities affecting Work of this Section. Submit a pre-demolition inspection report. Ensure the Owner of premises being inspected is represented at inspection.
- .2 Where appropriate prepare a photographic or video record of existing conditions, particularly of existing work scheduled to remain.
- .3 Where applicable, examine adjacent tenancies not part of the scope of work. Determine extent of protection required to areas and related components not subject to demolition.

#### **1.6 SUBMITTALS**

- .1 Provide required information in accordance with Section 01 33 00.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
  - .1 Prepare schedule in conjunction with overall project schedule, and outline proposed methods in writing. Obtain approval before commencing demolition work, and indicate the following:
    - .1 Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity
    - .2 Interruption of utility services
    - .3 Coordination for shutoff, capping, and continuation of utility services

#### **1.7 QUALITY ASSURANCE**

- .1 Conform to requirements of all authorities having jurisdiction.
- .2 Comply with applicable requirements of CSA S350-M "Code of Practice for Safety in Demolition of Structures".
- .3 Work of this Contract shall be executed by an approved company having a minimum of five (5) years continuous experience and able to deploy adequate equipment and skilled personnel to complete work expeditiously in an efficient and orderly manner.
- .4 Perform cutting and coring, where applicable, by a firm specializing in this type of work, able to produce evidence of successful completion of similar work over a period of at least five (5) years immediately prior to date of contract.
- .5 Apply for, secure, arrange and pay for all permits, notices and inspections necessary for proper execution and completion of work in this Section.
- .6 Professional Engineer Qualifications: Procure the services of a professional engineer who is experienced in providing relevant engineering services to perform the following:
  - .1 Review portions of the Work requiring structural performance, prepare plan of action, engineer temporary shoring and bracing, and Provide site administration and inspection for work of this Section.

#### **1.8 REMAINING AND ADJACENT STRUCTURES**

- .1 Do not interfere with, encumber, endanger or create nuisance, from any cause due to demolition work, to public property or any adjacent attached and/or detached structures in possession of Owner or others, which are to remain, whether occupied or unoccupied during this work.
- .2 Make good damage to such structures resulting from work under this Section at no cost to Owner. Make good adjacent building surfaces damaged by work of this Section.

#### **1.9 PROTECTION OF SERVICES AND STRUCTURES**

- .1 Prior to saw cutting or core drilling of existing concrete slabs, use ground penetrating radar (GPR) to detect utilities and structural reinforcing. Concrete X-Rays can be used when access to both sides of concrete slab is accessible for placement of required x-ray film.

#### 1.10 EXISTING SERVICES

- .1 Prior to start of demolition disconnect all electrical service lines in the areas to be demolished. Post warning signs on all electrical lines and equipment which must remain energized to serve other areas during period of demolition. Disconnect electrical service lines in demolition areas to the requirements of local authority having jurisdiction.
- .2 In each case, notify the affected utility company in advance and obtain approval where required before commencing with the work on main services.
- .3 Arrange with utility companies for locating of such services and for disconnection of existing services owned by utility companies and which will be disconnected by said utility companies, provided such services do not interfere with adjacent tenancy operators.
- .4 Remove sewer and water lines where required within existing building as deemed necessary, and cap to prevent leakage, in accordance with authorities having jurisdiction.
- .5 Existing services are to be maintained where required for normal tenant operation during regular hours of operation and/or as deemed necessary by Owner.

#### 1.11 DECOMMISSIONED SERVICES

- .1 Remove fully decommissioned electrical and mechanical service lines, plumbing, ducting, fixtures and all fasteners and supports for decommissioned items.
  - .1 Remove sewer and water lines where required within existing building as deemed necessary, and cap to prevent leakage, in accordance with authorities having jurisdiction.
- .2 Patch and repair surfaces affected by this selective demolition to match existing adjacent surfaces, as approved by the Consultant.

#### 1.12 EXISTING WARRANTIES

- .1 Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

#### 2 Products

#### 2.1 DEBRIS, SALVAGED MATERIAL AND EQUIPMENT DISPOSAL

- .1 All materials and or equipment salvaged from demolition work becomes property of demolition Contractor unless designated otherwise.
- .2 At no cost to Owner repair or replace material and/or equipment scheduled to remain which is damaged by demolition work. Do not sell any salvaged material or equipment directly from project site.
- .3 Remove waste debris continually and entirely from project site during demolition work. Do not load vehicles transporting such debris beyond their safe capacity or in a manner which might cause spillage on public or private property. If spillage does occur, clean up immediately to prevent traffic hazards or nuisance.

#### 2.2 PROTECTION

- .1 Temporary Protection:
  - .1 Erect temporary hoarding protection, as indicated in Section 01 56 26, to enclose openings in exterior walls, and/or provide security to partially occupied interior spaces.
  - .2 Erect temporary dust screens, as indicated in Section 01 50 00, to prevent dust and debris to enter areas of the building which are not scheduled for demolition. Remove temporary dust screens when no longer required.

## 2.3 REPAIR MATERIALS

- .1 Use repair materials identical to existing materials:
  - .1 If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
  - .2 Use a material whose installed performance equals or surpasses that of existing material.
  - .3 Comply with material and installation requirements specified in individual Specification Sections.
- .2 Floor Patching and Levelling Compounds: Cement based, trowelable, self-levelling compounds compatible with specified floor finishes; as indicated in Section 03 35 00.
- .3 Gypsum Board Patching Compounds: Joint compound to ASTM C475, bedding and finishing types thinned to provide skim coat consistency to patch and prepare existing gypsum board walls ready for new finishes in accordance with Section 09 21 16.
- .4 Fireproofing: Patch and repair all fireproofing damaged during demolition of adjacent surfaces with compatible fireproofing materials. Provide test reports from fireproofing manufacture warranting installation, adhesion and compatibility between existing and new fireproofing materials.

## 3 Execution

### 3.1 GENERAL

- .1 Exercise caution in dismantling, disconnecting of work adjacent to existing work designated to remain.
- .2 Carry out demolition in a manner to cause as little inconvenience to the adjacent properties as possible.
- .3 Carry out demolition in an orderly and careful manner.
- .4 Demolition by explosives is not permitted.
- .5 Selling or burning of materials on site is not permitted.
- .6 Sprinkle exterior debris with water to prevent dust. Do not cause flooding, contaminated run-off or icing. Do not allow waste material, rubbish, and windblown debris to reach and contaminate adjacent properties.
- .7 Lower waste materials in a controlled manner; do not drop or throw materials from heights.
- .8 At end of each day's work, leave in safe condition so that no part is in danger of toppling or falling.

### 3.2 SAFETY AND SECURITY

- .1 Maintain security of the building at all times during demolition work.
- .2 Provide and maintain fire prevention equipment and alarms accessible during demolition.

### 3.3 ACCESS ROUTES

- .1 Restrict operations to designated access routes.
- .2 Do not obstruct roads, parking lots, sidewalks, hydrants and the like.

### 3.4 SELECTIVE DEMOLITION

- .1 Provide necessary shoring and supports to assure safety of structure prior to cutting and coring.
- .2 Where practical, sawcut and remove material as required.
- .3 Where sawcutting is not appropriate, use suitable hand tools.

- .4 Demolish, cut-out and remove from site all other work noted on drawings or required to permit new construction.
- .5 Do not allow water to accumulate or flow beyond work area. Provide receptacles and mop-up as work proceeds.
- .6 Fill all openings in gypsum board walls with gypsum board and steel framing to match existing, skim coat to make wall smooth and even.
- .7 Demolish existing flooring and wall finishes, and adhesive remnants as follows:
  - .1 Floor and wall substrate shall be smooth, free from ridges and depressions, and adhesive remnants that could telegraph through new flooring and wall finishes.
- .8 Demolish completely all ceiling panels and grid as indicated.
- .9 Patch and repair all walls, floor and ceilings damaged during demolition with material matching adjacent walls, prepare ready for new finishes.
  - .1 Prepare existing surfaces schedule to receive new finish by grinding, filling, over-coating, stripping, washing, etching, shot blasting or other chemical or mechanical means, as required to ensure satisfactory installation of new finish.

### **3.5 PATCHING AND REPAIRING**

- .1 Floors and Walls:
  - .1 Where walls or partitions that are demolished extend from one finished area into another, patch and repair floor and wall surfaces in the new space.
  - .2 Provide an level and smooth surface having uniform finish colour, texture, and appearance.
  - .3 Remove existing floor and wall coverings and replace 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 Sections of these Specifications.
  - .6 Patch any existing areas adjoining / adjacent to new construction in good workmanship, filling and finishing gaps between finishes to allow new work to blend seamlessly with existing work.
  - .7 Where patching occurs in a painted surface, 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.
  - .8 Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

### **3.6 EXCESSIVE DEMOLITION**

- .1 Where excessive demolition occurs, be responsible for cost of replacing such work.
- .2 Consultant shall determine extent of such 'over-demolition' and method of rectification.

### **3.7 COMPLETION**

- .1 Leave project site as directed, reasonably clean and presentable, free from above grade debris, any salvaged material and/or equipment except those designated to remain.
- .2 Maintain access to exits clean and free of obstruction during removal of debris.

**END OF SECTION**



1 General

1.1 SUMMARY

- .1 Work of this Section includes the following:
  - .1 Requirements for concrete floor additives such as:
    - .1 Penetrating sealer
  - .2 Testing and measurement for floor flatness and levelness,
  - .3 Trowelling, levelling, and floating of floor surfaces for ready for applied finishes.

1.2 RELATED REQUIREMENTS

- .1 Section 05 50 00: Miscellaneous Metals

1.3 DEFINITIONS

- .1 Floor Classifications: Classification of concrete floor slabs based on their intended use, methods of finishing and finish materials applied to flooring as denoted by the F-rating below, and as follows:
  - .1 Single Course Floor: Floors placed in a single course with final finishing applied to properly levelled concrete.
  - .2 Finish or Finishes: Materials applied to finished concrete surface, i.e.: stained or coloured concrete, carpet, resilient flooring or ceramic tile.
  - .3 Finishing: Methods, tools and equipment employed to achieve levelness or surface flatness for shored slabs and slabs-on-grade, and durability indicated and as follows:
    - .1 F3-Finishing: Floors having a straightedge value of  $\pm 1.6\text{mm}$  over 3048mm (1/6" over 10'); similar to CSA A23.1 Class C Slab Finishing.

1.4 REFERENCE STANDARDS

- .1 American Society for Testing and Materials (ASTM):
  - .1 ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compound for Curing Concrete.
  - .2 ASTM C979/C979M-10, Standard Specification for Pigments for Integrally Colored Concrete.
- .2 American Concrete Institute (ACI):
  - .1 ACI 117-2010, Specifications for Tolerances for Concrete Construction and Materials and Commentary
  - .2 ACI 302.1R-15, Guide for Floor and Slab Construction
- .3 Canadian Standards Association (CSA):
  - .1 CSA A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
- .4 International Concrete Repair Institute (ICRI):
  - .1 ICRI 310.2R-2013, Guideline for Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays and Concrete Repair

1.5 ADMINISTRATION REQUIREMENTS

- .1 Coordination: Coordinate a meeting between the Contractor, Subcontractor responsible for concrete placement, and the Consultant to determine Site Quality Control testing section borders and sample measurement line locations, method of measurement, and accuracy requirements of the measuring devices.

- .2 Pre-Construction Meetings: Arrange meeting with Contractor, Subcontractor for work of this Section and other Subcontractors affected by work of this Section to discuss effects and issues governing installation of concrete finishing materials; prepare an outline agenda for meeting in accordance with Section 01 31 19 Project Meetings.

## 1.6 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
  - .1 Product Data: Submit manufacturer's product data for each materials specified including recommended application rates and methods of installation.
- .3 Informational Submittals: Provide the following submittals during the course of the work:
  - .1 Site Quality Control Submittals: Submit results for straightedge measurements to demonstrate compliance with specified tolerances. Record the following information on a drawing indicating floor slab layout, column locations and slab penetrations:
    - .1 Indicate variance from specified straightedge measurements as a + or - value.
    - .2 Failed tests in excess of 50% of the straightedge will require the Subcontractor to flash patch floor to achieve specified tolerance; example of tolerance failure.
    - .3 Slabs-On-Grade: Measurement of 1.6mm (1/16") or greater than  $\pm 6$ mm (1/4") measurement will be considered as a failed test and will require flash patching.
    - .4 Suspended Slabs: Measurement of 3mm (1/8") or greater than  $\pm 6$ mm (1/4") measurement (80% tolerance allowance) will be considered as a failed test and will require flash patching.

## 1.7 PROJECT CLOSEOUT SUBMISSIONS

- .1 Operation and Maintenance Data: Submit detailed cleaning and maintenance instructions for concrete densifier products, and instruct Owner in proper care and maintenance of specified floor finishes, including a complete list of floor care products that will be required for ongoing maintenance, in accordance with Section 01 33 00 Submittals; Operation and Maintenance Data.

## 1.8 QUALITY ASSURANCE

- .1 Qualifications:
  - .1 Work of this Section shall be executed by a company that has adequate equipment and skilled tradesmen to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified, during a period of at least the immediate past five years.
- .2 Co-operation:
  - .1 Ensure that concrete supplied for slabs contains no admixtures which would be incompatible with floor finishing materials.

## 1.9 SITE CONDITIONS

- .1 Environmental Requirements:
  - .1 Ensure that adequate temporary heating is provided as required for cold weather work.
  - .2 Provide adequate moisture, sun shades and wind barriers to prevent too rapid drying of concrete during hot weather.
- .2 Protection:
  - .1 Ensure that finished concrete floor areas are protected from abrasion from foot or wheeled traffic, and from damage caused by spillage of oil or other harmful materials.

2 Products

**2.1 MATERIALS**

- .1 Unless specified otherwise, materials shall meet specified requirements of Section 03 30 00.
- .2 Curing Sheet: 2 mil polyethylene sheet conforming to CGSB 51-GP-51M or laminated waterproof kraft paper.
- .3 Liquid Applied Penetrating Sealer: Clear water based silane micro emulsion penetrating concrete sealer formulated to prevent water and chloride intrusion into concrete surfaces.
  - .1 Basis of Design Materials:
    - .1 Planiseal WR 40 by Mapei Inc.
    - .2 Cipadm S-40 by CPD Construction Products
    - .3 Sikagard SN40 by Sika Canada Inc.
    - .4 Hydrozo Silane 40 VOC by BASF.
  - .4 Topping: Cementitious, self levelling, single component, polymer modified overlayment, for application thicknesses to a minimum of 19mm to 50mm ( $\frac{3}{4}$ " to 2").
    - .1 Basis of Design Materials:
      - .1 MAPEI Canada Inc., Ultratop
      - .2 Sika Canada Ltd., Sikafloor Level 25CA
      - .3 W.R. Meadows of Canada, Gem-Crete TO
    - .5 Patching and Flash Patching Materials: Cementitious based, polymer modified, fine aggregate, single component, rapid curing, early strength floor patching compounds having high adhesion, for application in thicknesses to a minimum of 1/8" to 1".
      - .1 Basis of Design Materials:
        - .1 Planitop 18ES by MAPEI Canada Inc.
        - .2 SikaQuick 1000 by Sika Canada Ltd.
        - .3 Meadow-Crete H by W.R. Meadows of Canada
    - .6 Joint Sealant: Refer to Section 07 92 00: Sealants.

3 Execution

**3.1 EXAMINATION**

- .1 Before commencing work, ensure that surfaces are acceptable to receive and maintain concrete finishing, and that specified installation will be achieved.

**3.2 FINISHING FLOORS AND SLABS**

- .1 Finish floors and slabs in accordance with CSA A23.1 and ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces; do not wet concrete surfaces.

**3.3 INSTALLATION**

- .1 Concrete Finishing:
  - .1 Roll or tamp concrete to force coarse aggregate into concrete mix and then screed.
  - .2 Bring surface to true grade by floating.
  - .3 Steel trowel to a true and even surface.
  - .4 Follow with second steel trowelling to produce a smooth burnished surface.

- .2 Sealed Floors:
  - .1 Seal all exposed concrete floors. Apply sealer as recommended by manufacturer. Install bond breaker of silica sand, polyethylene film strip or foam filler in bottom of joints.
- .3 Control Joints:
  - .1 As soon as concrete surface is firm enough not to be torn or damaged by cutting, cut 5mm (3/16") wide control joints into surface of concrete with abrasive blade power saw.
  - .2 Locate control joints on centre lines of columns, and at maximum spacing of 6096mm (20') in both directions unless noted.
  - .3 Cut joints in slabs on grade 38mm (1-1/2") deep.
  - .4 Within four (4) weeks of cutting joints, fill them with joint sealant. Completely clean side joint surfaces of dirt, oil, grease, and similar contaminants. Mask floor surfaces at joints while pouring. Prime side joint surfaces with compatible primer if surfaces are not completely dry.
- .4 Cast-in all items as supplied by other Sections.

### **3.4 PATCHING AND REFINISHING**

- .1 Before completion of project, patch and refinish defective surfaces to match surrounding areas with no discernible variation in appearance.

### **3.5 CONCRETE FINISHING SCHEDULE**

- .1 Exposed Concrete:
  - .1 Steel trowel finish, cured by liquid curing-sealing compound.
- .2 For Resilient Tile Flooring:
  - .1 Steel trowel finish, cured by compatible curing compound, curing sheet or moist curing.
- .3 Concrete Bases and Curbs for Equipment:
  - .1 Hand trowel finish.

**END OF SECTION**

1 General

**1.1 SUMMARY**

- .1 Supply and install all miscellaneous metal work indicated on drawings and not included in the work of other Sections in addition to items listed in this Section.

**1.2 RELATED REQUIREMENTS**

- .1 Section 03 35 00: Concrete Finishing
- .2 Section 06 10 00: Rough Carpentry
- .3 Section 08 41 13: Aluminum Framed Entrances and Storefronts
- .4 Section 09 21 16: Gypsum Wallboard
- .5 Section 09 90 00: Painting
- .6 Read carefully all other Sections and review drawings to determine extent of metal work supplied and installed, or installed by others.
- .7 Be responsible for co-ordinating this section with all related sections.

**1.3 REFERENCE STANDARDS**

- .1 American Society for Testing and Materials (ASTM):
- .1 ASTM A53/A53M-12, Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless
- .2 ASTM A325-10, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
- .3 ASTM A653/A653M-11, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- .4 ASTM C939-10, Standard Test Method for Flow of Grout for Preplaced Aggregate Concrete (Flow Cone Method)
- .5 ASTM A1011/A1011M-12b, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with improved Formability, and Ultra-High Strength
- .6 ASTM C1107/C1107M-11, Standard Specification for Packaged Dry, Hydraulic Cement Grout (Nonshrink)
- .2 Canadian Standards Association (CSA):
- .1 CSA G40.20-04/G40.21-04 (R2009), General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel
- .2 CAN/CSA-G164-M92 (R2003), Hot Dip Galvanizing or Irregularly Shaped Articles
- .3 CSA-S16-09, Design of Steel Structures
- .4 CSA-S136-07, North American Specification for the Design of Cold Formed Steel Structural Members
- .5 CSA W47.1-09, Certification of Companies for Fusion Welding of Steel
- .6 CSA W55.3-08, Certification of Companies for Resistance Welding of Steel and Aluminum
- .7 CSA W59-03 (R2008), Welded Steel Construction (Metal Arc Welding)

- .3 Canadian General Standards Board (CGSB):
  - .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating
  - .2 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type
  - .3 CGSB 31-GP-105Ma, Zinc Phosphate Conversion Coatings for Paint Base
- .4 The Society for Protective Coatings (SSPC):
  - .1 SSPC1 Solvent Cleaning - 2004
  - .2 SSPC2 Hand Tool Cleaning - 2004
  - .3 SSPC-3 Power Tool Cleaning - 2004
  - .4 SSPC-6 Commercial Blast Cleaning - 2007

#### **1.4 QUALITY ASSURANCE**

- .1 All Codes and Standards referred to in this Specification shall be current editions including all latest revisions and addenda.
- .2 Conform to requirements of CSA-S16, Design of Steel Structures and CAN/CSA-S136, Cold Formed Steel Structural Members.
- .3 Architectural metals work shall be of the highest architectural quality, free of scratches, pitting, roughness, marring, discolouration, staining and other imperfections.
- .4 Work of this Section to be executed by firm thoroughly conversant with laws, by-laws and regulations which govern, and capable of workmanship of best grade of modern shop and field practice known to recognized manufacturer's specializing in this work.
- .5 Work of this Section shall be executed by workers especially trained and experienced in this type of work. Have a full time, senior, qualified representative at the site to direct the work of this Section.
- .6 Where required by authorities having jurisdiction, have work of this Section designed by a professional engineer licensed to design structures and registered in the Province of the Work.

#### **1.5 SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00, bearing stamp or seal and signature of the Professional Engineer responsible for the design of the work of this Section.
- .2 Shop Drawings:
  - .1 Make thorough examination of drawings and details, determine the intent, extent, and materials, and be fully cognizant of requirements when preparing shop drawings.
  - .2 Submit shop drawings showing and describing in detail all work of this Section including large scale detail of members and materials, of connection and interfacing with work of other Sections, jointing details, and of anchorage devices, dimension, gauges, thicknesses, description of materials, metal finishing, as well as other pertinent data and information.
  - .3 Digital files of design drawings shall not be used in the preparation of shop drawings.

#### **1.6 STORAGE, DELIVERY, HANDLING AND PROTECTION**

- .1 Coordinate deliveries to comply with construction schedule and arrange ahead for strategic off the ground, under cover storage locations. Do not load any area beyond the design limits.
- .2 Adequately protect and crate all components against damage, dirt, disfigurement and weather during delivery and storage. Damaged materials shall not be used and shall be replaced by approved material.
- .3 Cover and protect the work of other Sections in the area of work from damage. Make good all damage to the satisfaction of the Consultant.

- .4 Protect the installed work of this Section and on completion the work shall be examined and damage shall be remedied to the complete satisfaction of the Consultant.

2 Products

**2.1 MATERIALS**

- .1 Structural Steel Sections and Steel Plate: New stock (not weathered or rusted); to conform to CAN/CSA-G40.21, Grade 300W (44W) and Grade 350W (50W) for wide flange shapes.
- .2 Hollow Structural Sections (HSS): New stock; to conform to CAN/CSA-G40.21, Grade 350W (50W), Class C, stress relieved.
- .3 Sheet Steel (Structural Quality): Conforms to ASTM A1011/A1011M.
- .4 Sheet Steel (Commercial Quality): Conforms to ASTM A653/A653M, stretcher levelled or temper rolled.
- .5 Tube: Conforms to ASTM A53.
- .6 Galvanized Sheet Steel (Commercial Quality): Galvanized coating G90 (Z275) in accordance with ASTM A653/A653M, minimized spangle, stretch levelled or temper rolled. Specially treat by phosphate conversion process conforming to CGSB 31-GP-105Ma ready to receive prime paint finish.
- .7 Steel Pipe: Hot-dip galvanized, zinc coated, welded and seamless type steel pipe conforming to ASTM A53/A53M.
- .8 Aluminum Plate and Sheet: ASTM B209M, Alloy 6061-T6.
- .9 Aluminum Extrusions: ASTM B221M, Alloy 6063-T6.
- .10 Non-Shrink Grout: Premixed, high strength, maximum bearing, impact resistant, non-shrink non-metallic aggregate grout having minimum 76 Mpa 28 day compressive strength and conforms to ASTM C939 and ASTM C1107/C1107M, 'Embeco Premixed Grout' by Master Builders Technologies Ltd., or 'Tartan Grout Iron' by Webster & Sons Ltd., or 'Sika Grout 212 HP' by Sika Canada Inc.
- .11 Galvanizing: All uncoated steel specified to be galvanized shall be galvanized after fabrication by the hot dip process according to CAN/CSA-G164, with minimum coating of 2 oz./sq.ft. Galvanize after all welding is complete. Welding of galvanized material will not be permitted. Specially treat by phosphate conversion process conforming to CGSB 31-GP-105Ma ready to receive prime paint finish.
- .12 Primer Paint: CISC/CPMA 2-75.
- .13 Bolts, Nuts, Washers: Conforms to ASTM A325.
- .14 Welding Materials: Conforms to CSA W59.
- .15 Metal Filler: Polyester based type.
- .16 Painting:
- .1 Shop Applied Structural Steel Primer: Steel Spec Universal Primer (B50RV6227 Red), by Sherwin Williams Company of Canada Ltd., or approved equal. Apply a minimum of 2 mils dft./coat. Grey coloured primer is acceptable.
- .2 Zinc Rich Paint For Touch-up of Galvanized Metals: Ready mixed, zinc-rich primer conforming to CAN/CGSB-1.181, Sealtight Galvafruid Zinc-Rich Coating by W.R. Meadows of Canada Limited or Zinc Clad No. 5 Organic Zinc Rich Primer by Sherwin Williams Company of Canada Ltd., or approved equal.
- .3 Touch-up Primer (On Site): Procryl Universal Acrylic Primer by Sherwin Williams Company of Canada Ltd, or approved equal. Touch-up primer shall be no less than 3 mil dft.

- .4 Refer to Section 09 90 00, and coordinate with the above.
- .17 Isolation Coating: Acid and alkali resistant bituminous paint.
- .18 Building Paper: Conforms to CAN/CGSB-51.32.
- .19 Butyl Tape: Extruded, high grade, macro-polyisobutylene tape of size, width and shore hardness to suit conditions.

## 2.2 FABRICATION

- .1 Fit and assemble work in shop where possible. Execute work according to details and reviewed shop drawings.
- .2 Take measurements at the building for work which is to fit or be connected to steel or concrete before commencing fabrication.
- .3 Where shop fabrication is not possible, make trial assembly in shop.
- .4 Do all welding in accordance with requirements of CSA W59, CSA W55.3 and CSA W47.1 including all supplements. Weld stainless steel electric arc process. Grind welds smooth and flush with surface of parent metal, where exposed to view and where specifically indicated on drawings. Welds shall be continuous seam welds unless specified otherwise. Maintain sharp arises.
- .5 Fit joints and intersecting members accurately in true planes, square, plumb, straight with tight joints and intersections.
- .6 Provide adequate reinforcing, fastenings, anchors, accessories required for fabrication and erection of work of this Section. Such items occurring on or in an exterior wall or slab shall be hot-dip galvanized. Make thread dimensions such that nuts and bolts will fit without rethreading or chasing threads.
- .7 Fabricate, drill and tap members to accommodate attachments, anchorage and work of other Sections where located and directed by them.
- .8 Exposed steel surfaces shall be smooth and free from imperfections such as warping, buckling, weld marks, burrs, rust and scale.
- .9 Gauges and sizes of metal shall be adequate for various conditions.
- .10 Make exposed metal fastenings and accessories of same material, texture, colour and finish as base metal on which they occur unless otherwise shown or specified. Keep exposed fastenings to an absolute minimum evenly spaced and neatly laid out. Make fastenings of permanent type unless otherwise indicated.

## 2.3 SHOP PAINTING AND PROTECTION

- .1 As per SSPC2 Hand Tool Clean and SSPC1 Solvent Clean, clean welds by wire brushing and wash down with clean water, to remove the chemical residues left by the electrodes, prior to painting.
- .2 Prepare steel as per SSPC-3 Power Tool Cleaning for Interior or SSPC-6 Commercial Blast Cleaning for exterior members. Remove rust, mill scale, oil, dirt, and other foreign matter before commencing shop painting.
- .3 Apply shop coat of primer to all surfaces except areas requiring field welding. Apply by brush, working paint well into surfaces, interstices and cavities.
- .4 Primer is to be free of runs, sags, or other collections of primer due to dipping of members into primer.
- .5 Steel work shall be painted under cover, and shall remain under cover, until the paint protection is dry.
- .6 Prime field welded areas after erection and touch up shop coat where damaged and barred by erection and handling.



- .7 Prime steel with two full coats of paint in strict accordance with paint manufacturer's directions.
- .8 Give the parts which are inaccessible after assembly two coats of primer coat paint, of different colours, when members are noted to be painted.

## 2.4 HOT DIP GALVANIZING

- .1 Hot dip galvanize, after fabrication, steel metal fabrication items. Straighten shapes and assemblies true to line and plane after galvanizing. Repair damaged galvanized surfaces with brush or spray-applied anti-corrosion coating containing 92-95% zinc, in accordance with manufacturer's printed directions.
  - .1 Members exposed to elements when in final location.
  - .2 Members embedded on exterior side of exterior walls.
  - .3 Members imbedded in concrete.
  - .4 Members specified in this Section or indicated on Drawings.
- .2 Hot-dip galvanize members in accordance with CAN/CSA G164 and requirements of the following ASTM standards, with minimum coating weights or thicknesses as follows:
  - .1 Rolled, Pressed and Forged Steel Shapes, Plates, Bars and Strips: ASTM A123/A123M; average weight of zinc coating of actual surface
    - .1 4.8 mm (3/16") and less member thickness: 600 g/sq.m.
    - .2 6 mm (1/4") and heavier members: 640 g/sq.m.
  - .2 Iron and Steel Hardware: ASTM A153/A153M; minimum weight of zinc coating, in gram per square meter of surface, in accordance with Table 1 for the various classes of materials used in the Work.

## 2.5 ALUMINUM FINISHES

- .1 Finish designations prefixed by AA comply with the system established by the Aluminium Association for designating aluminium finishes.
- .2 As Fabricated Finish (Mill Finish): AA-M10, as fabricated mechanical finish.
- .3 Clear Anodic Finish: AA-M12C22A41, as fabricated nonspecular mechanical finish, medium matte etched chemical finish, architectural class I clear anodic coating of minimum 18 um (0.7 mil) thick complying with AAMA 611.

## 3 Execution

### 3.1 GENERAL

- .1 Verify at site that the Work to receive the work of this Section is free of irregularities detrimental to the installation and performance of the work and that it is located correctly and at proper levels before delivery and installation.
- .2 Erection: To meet specified requirements of CAN/CSA-S16.
- .3 Bearing Plates and Anchors: Standard.
- .4 Anchors: Anchors to structural concrete shall be approved inserts set into concrete or approved self-drilling expansion insets drilled and placed afterwards.

### 3.2 INSTALLATION

- .1 Assemble and erect work plumb, true, square, straight, level and accurate to sizes detailed, to reviewed shop drawings, free from distortion and defects detrimental to appearance and performance.
- .2 Isolate metals where necessary to prevent corrosion due to contact between dissimilar metals and between metals and masonry, concrete or plaster. Use bituminous paint or butyl tape.

- .3 Supply adequate instructions, templates, and if necessary, supervise installation of the fastenings or accessories requiring to be built-in by other Sections of the Work.

### 3.3 SCHEDULES

- .1 Where items are required to be built into masonry, concrete or other work, supply such items to respective Sections with all anchors and accessories for building in.
- .2 Itemized List: Supply and install metal work listed below unless specifically designated to be supplied only. Each item shall be as shown on drawings and as detailed on reviewed shop drawings.
- .3 Miscellaneous Steel Framing, Channels, Angles, Plates and Brackets: As required and indicated on drawings.
- .4 Loose Lintels:
  - .1 Provide and install loose lintels if not by structural steel.
  - .2 Finish: Hot-dip galvanized after fabrication.
- .5 Masonry Lateral Supports:
  - .1 Install deflection space and lateral support for non-load-bearing masonry walls and partitions in accordance with specified requirements of CAN3-S304-M, where not provided by Section 05 12 00, Structural Steel.
  - .2 At walls with concealed tops:
    - .1 3" x 2" x 1/4" angles 8" long on both sides of walls. Anchor to structure above wall.
  - .3 At walls with tops exposed to view:
    - .1 3" x 2" x 1/4" angles, continuous on both sides of wall. Anchor to structure above wall.
  - .4 Finish: Prime paint.
- .6 Frames for Overhead Coiling Fire Shutters:
  - .1 Supply and install 1/4" thick bent steel plate around openings at heads and jambs to suit wall thickness and return 3" on either side of wall face. Provide extensions on interior side at head to accommodate track and operators to suit doors specified.
  - .2 Finish: Hot-dip galvanized after fabrication, ready for painting by Section 09 90 00.
- .7 Aluminum Storefront Support Framing:
  - .1 Provide entrance vestibule support framing as required and indicated on drawings, having all welded construction. Framing shall be designed to provide a rigid trouble free support including safety factor of 3 to 1.
  - .2 Finish: Prime paint.
- .8 Other Miscellaneous Metal Components:
  - .1 As required and indicated on drawings.
  - .2 Finish: Prime paint for interior components, ready for finishing by Section 09 90 00 and hot-dip galvanized after fabrication for exterior components.

**END OF SECTION**

1 General

**1.1 SUMMARY**

- .1 Supply all labour, materials, equipment, services and perform all operations required to complete all rough carpentry work to the full intent of the drawings and as herein specified.

**1.2 RELATED REQUIREMENTS**

- .1 Section 06 20 00: Finish Carpentry
- .2 Section 09 21 16: Gypsum Wallboard
- .3 Section 09 90 00: Painting

**1.3 DELIVERY, STORAGE, HANDLING AND PROTECTION**

- .1 Co-ordinate deliveries to comply with construction schedule and arrange ahead for off-the-ground, under cover storage location. Do not load any area beyond the design limits.
- .2 Materials shall be carefully checked, unloaded, stored and handled to prevent damage. Protect materials with suitable non-staining waterproof coverings.
- .3 Do not store seasoned materials under conditions that will cause their moisture content to increase.
- .4 Protect edges and corners of sheet materials from damage during handling and storage.
- .5 Store preservative-treated materials under cover, off the ground and protected from moisture.

2 Products

**2.1 MATERIALS**

- .1 Framing Lumber:
  - .1 Lumber for structural components shall be of species and grade specified, well seasoned, processed and stamped at same mill with appropriate grade markings. Conform to requirements of Standard Grading Rules for Canadian Lumber of National Lumber Grades Authority the (NLGA) with latest supplements, approved by the Canadian Lumber Standards Administrative Board.
- .2 Framing, Furring, Strapping, Blocking:
  - .1 Spruce, 122c, "Standard" light framing, except as otherwise specified.
- .3 Plywood Sheathing:
  - .1 Shall be 3/4" thick and/or thickness as indicated on drawings, exterior grade at exterior locations, Douglas Fir plywood, veneer core, Select Sheathing - Tight Face, unsanded, "B" faces and conforming to CSA 0121-08.
- .4 Rough Hardware:
  - .1 Provide rough hardware such as nails, spikes, staples, H-clips, bolts, nuts, washers, screws, clips, strap iron and including hardware for temporary enclosures. Nails for plywood shall be annular or spiral type, all other nails shall be spiral type. All nails, spikes and staples shall conform to CSA B111. All rough hardware shall be galvanized unless otherwise noted. Galvanizing shall conform to CAN/CSA-G164.
- .5 All Other Materials and Hardware:
  - .1 Shall be as noted on drawings.

## 2.2 PRESSURE FIRE RETARDANT TREATED MATERIALS

- .1 Treat by pressure impregnation with fire-retardant chemicals in accordance with CAN/CSA O80 Series -08 to provide classification for flame spread of not more than 25, smoke developed of not more than 75 in accordance with CAN4 S102.
- .2 All fire retardant wood must comply with the requirements in AWPA Standard C20 for lumber and C27 for plywood.
  - .1 AWPA C20: Structural Lumber, Fire-Retardant Pressure Treatment, lumber materials shall only be of species listed. After treatment, lumber 50 mm or less in thickness shall be kiln dried to moisture content of 8% or less.
  - .2 AWPA C27: Plywood, Fire-Retardant Pressure Treatment, plywood or laminated materials shall be manufactured with exterior grade adhesives. After treatment, plywood shall be kiln dried to moisture content of 8% or less.
  - .3 All species to comply with CAN4 S102 for surface-burning characteristics and shall bear identification showing classification and type of fire retardant.
- .3 Each piece or bundle of fire-retardant treated material or panel to bear ULC inspection label or stamp attesting to FRS rating indicating flame spread, smoke developed, and fuel contributed classification meeting AWPA standard C20 and C27 for Type A Use.
- .4 Fire retardant chemicals used to treat lumber must comply with FR-1 of AWPA Standard P17 and shall be free of halogens, sulphates and ammonium phosphate.
- .5 Acceptable materials: Plywood and lumber materials treated by licensed applicators with fire retardant materials from the following:
  - .1 Hickson Corporation – Dricon FRTW
  - .2 Hoover Treated Wood Products Inc. – Pyro-Guard
  - .3 Chemical Specialties Inc. – D-Blaze

## 3 Execution

### 3.1 INSTALLATION-GENERAL

- .1 Consult with and co-operate with other Sections in advance and build-in or make provisions for installation of other work.
- .2 Provide and fit in place all furring, strapping, battens, nailers, sleepers, grounds and blocking required to provide adequate properly placed fixing for all wood finishes, fitments and as required for the work of others trades.
- .3 Blocking, strapping and other rough carpentry indicated shall not be regarded as complete or exact. Provide all rough carpentry work required, whether specifically shown or not. Grounds shall be of a thickness to provide for application of finishes. Room side surfaces of grounds shall be plumb and in true plane throughout.
- .4 All nails shall be long enough so that at least half their length penetrate in to the second member. Splitting of wood members shall be minimized by staggering the nails in the direction of the grain and by keeping nails well in from edges.
- .5 Blocking shall be through-bolted to structure.
- .6 Anchor rough bucks to concrete or masonry with 3/8" diameter expansion bolts and shields or Drummond and Reeves security buck anchors, minimum three per jamb.

### 3.2 WOOD BLOCKING, CANTS AND NAILERS

- .1 Provide wood blocking, cants and nailers, where shown to be required as detailed. Bolt securely in place. Block under cants same thickness as installed roof insulation.

- .2 Check mechanical, electrical, architectural drawings and provide all blocking, cants, nailers etc. required. Leave work ready for built-up bituminous roofing and prefinished sheet metal flashings.

### 3.3 PLYWOOD PANELS

- .1 Provide plywood panels required for electrical/telephone mounting of equipment and in other locations as indicated on drawings.

### 3.4 PRESSURE FIRE RETARDANT TREATED WOOD INSTALLATION

- .1 Field Cuts:
  - .1 Do not rip, mill or conduct extensive surfacing of fire retardant treated lumber, label will be voided.
  - .2 Only end cuts, drilling holes and joining cuts are permitted.
  - .3 All cuts on plywood will be considered end cuts.
  - .4 Fire-retardant lumber and plywood can be given a light sanding for cosmetic cleaning after treatment.
  - .5 Pre-cut to the greatest extent possible before treating.
- .2 Fire retardant treated plywood used in structural applications shall be graded or span-rated material.
- .3 Use only hot-dipped galvanized, corrosion resistant nail or screw fasteners. Staples are not acceptable for installation of fire resistant treated materials.
- .4 Where humidity conditions are such that moisture may condense between hardware and treated wood, hardware shall be back-primed with a corrosive-inhibitive paint.
- .5 Back-prime at contact points and fasteners to prevent electrolysis when fire retardant framing members are used in metal buildings.

**END OF SECTION**

1 General

**1.1 SUMMARY**

- .1 Supply all labour, materials, equipment, services and perform all operations required to complete all finish carpentry, millwork and fitment installation including but not limited to the following:
  - .1 Interior millwork
  - .2 Hardware
  - .3 High pressure decorative laminate
  - .4 Metal and wood doors, and all other items, to the full intent of the drawings and as herein specified.

**1.2 RELATED REQUIREMENTS**

- .1 Section 06 10 00: Rough Carpentry
- .2 Section 07 92 00: Sealants
- .3 Section 08 11 13: Steel Doors and Frames
- .4 Section 08 70 00: Hardware
- .5 Section 09 21 16: Gypsum Wallboard
- .6 Section 09 30 00: Tiling
- .7 Section 09 65 00: Resilient Flooring and Accessories
- .8 Section 09 90 00: Painting
- .9 Section 12 36 40: Stone Countertops

**1.3 QUALITY ASSURANCE**

- .1 Contractor executing work of this section shall have a minimum of five (5) years continuous Canadian experience in successful manufacture/fabrication and installation of work of type and quality shown and specified. Submit proof of experience upon Consultant's request.
- .2 Follow applicable requirements of The Architectural Woodwork Manufacturer's Association of Canada (AWMAC) Standard for Millwork latest edition, including supplements and modifications.
- .3 Unless otherwise indicated on drawings, all millwork shall be Custom Grade, in accordance with AWMAC standards.
- .4 Supplements and modifications to the above standards as indicated on the drawings or as specified herein shall govern work of this section.

**1.4 SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00.
- .2 Samples for Verification: Submit two (2) samples prior to fabrication of millwork as follows; accepted samples will form the standard of acceptance for the remainder of the work:
  - .1 High pressure decorative laminate for finishing of millwork
  - .2 Exposed Fasteners, Hardware and Accessories: One unit for each type and finish.
- .3 Shop Drawings:
  - .1 Submit detailed shop drawings of all shop fabricated finish carpentry components.

**1.5 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination: Coordinate sizes and locations of framing, blocking, furring, and reinforcements provided by work that is specified in other Sections is complete before starting work of this Section.

- .2 Pre-Construction Meeting: Arrange a preconstruction meeting in accordance with Section 01 31 19 – Project Meetings attended by Contractors personnel, Consultant, finish carpentry Subcontractor to discuss:
  - .1 Installation requirements
  - .2 Special surface effects and finishing
  - .3 Coordination of work with adjacent finishes
  - .4 Protection of finishes
  - .5 Acceptability of substrates and quality of materials being used for the project

#### **1.6 DELIVERY, STORAGE, HANDLING & PROTECTION**

- .1 Do not permit delivery of work of this section to site until area is sufficiently dry so that woodwork will not be damage by excessive changes in moisture content.
- .2 Coordinate deliveries to comply with construction schedules and arrange ahead for under cover storage location.
- .3 Materials shall be carefully checked, unloaded, stored and handled to prevent damage. Protect material with suitable non-staining waterproof coverings.
- .4 Store material in original, undamaged containers or wrappings.
- .5 Unsatisfactory materials shall be promptly removed from the site.
- .6 Adequately protect the structure and work of other sections during delivery, storage, handling and execution of the work of this section.
- .7 Provide tools, plant and other equipment required for the proper execution of the work of this section.

#### **1.7 SITE CONDITIONS**

- .1 Site Measurements: Verify dimensions by site measurements before fabrication and indicate measurements on Shop Drawings where casework is indicated to fit walls and other construction; coordinate fabrication schedule with construction progress to avoid delaying the Work; locate concealed framing, blocking, and reinforcements that support woodwork by site measurements before being enclosed and indicate measurements on Shop Drawings.
- .2 Established Dimensions: Establish dimensions and proceed with fabricating casework without confirmed site measurements where site measurements cannot be made without delaying the Work; coordinate with the construction to ensure that actual dimensions correspond to established dimensions; allow for trimming and fitting.
- .3 Ambient Conditions: Maintain area or room in which casework is being installed at a uniform temperature and humidity for 24 hours prior to, during and after installation in accordance with AWS for relative humidity and moisture content; provide additional lighting to maintain a minimum of 430 lx on surfaces and areas where casework is being installed.

#### **1.8 WARRANTY**

- .1 Warrant plastic laminate work of this Section against defects in materials and workmanship in accordance with General Conditions but for an extended period of two (2) years and agree to repair or replace faulty materials or work which appears during warranty period, without cost to the Owner/Tenant. Defects shall include but not be limited to, opening of joints, cracking, shrinkage, warpage, delamination of plastic laminate.

2 Products

2.1 MATERIALS

.1 Framing Lumber:

.1 Lumber for structural components shall be of species and grade specified, well seasoned, and processed and stamped at same mill with appropriate grade markings. Conform to requirements of standard grading rule for Canadian lumber of Nation Lumber Grades Authority (NLGA) latest issue, approved by Canadian Lumber Standards Administrative Board, as follows:

- .1 Rough Carpentry for built-in work: No. 2 select grade Ontario white pine.
- .2 Blocking, Ground, Furring and Strapping, Bucks and Nailing Strips: C.L.A. No. 1 grade pine, kiln dried stock.
- .3 Non-Exposed Softwood: Fabricator's option, meeting requirements of CAN/CSA O141-05(R2009), kiln dried for interior use to a moisture content of 4% to 8%, and 7% to 10% for exterior use; Surface 4 sides (S4S).

.2 Hardwood: Oak, Birch, Ash, Maple or other species, as indicated on drawings and conforms to requirements of AWMAC Custom Grade and NHLA Select Grade.

.3 Panel Materials:

- .1 Plywood: Douglas Fir veneer core plywood, 19mm (3/4") thick or thickness as indicated on drawings, Select Sheathing-Tight Face, good two sides, sanded "B" faces and conforms to CSA 0121.
- .2 Particleboard: ANSI A208.1, 700 kg/m<sup>3</sup> density.
- .3 Medium density fibreboard (MDF): ANSI A208.2, density minimum 750 kg/m<sup>3</sup>, moisture resistant; standard of acceptance: Premier Plus MR MDF by Flakeboard.

.4 Glue: CSA 0112 , Type 1. Water-resistant urea-formaldehyde resin glue.

.5 Plastic Laminate Covered Components:

- .1 Plastic laminate face sheets: High pressure, paper based, melamine surfaced, laminated plastic sheets, conforming to CAN3-A172, with thickness tolerances in accordance with Table 1 of CAN3-A172 and plastic laminate grades as follows:
  - .1 General Purpose Grade (GP): Minimum 1.27mm (0.050") thick.
  - .2 Post-forming Grade (PF): Minimum 1.06mm (0.042") thick.
- .2 Plastic laminate face sheet colour, gloss and texture: As selected by the Consultant from the manufacturer's standard product line.
- .3 Plastic laminate backing and liner sheets: High pressure, paper based, melamine surfaced, laminated plastic backing sheets, conforming to CAN3-A172, backing grade (BK), minimum 0.5mm (0.020") thick, colour as selected later by Consultant and by manufacturer of plastic laminate face sheets.
- .4 Cores: Douglas Fir veneer core plywood, Select Sheathing-Tight Face, good two sides, sanded "B" faces and conforms to CSA 0121-08, or Canadian Softwood Ply veneer core plywood, Select Sheathing-Tight Face, good two sides, sanded "B" faces and conforms to CSA 0151-09, 19mm (3/4") thick or thicknesses as indicated on drawings. Provide exterior, waterproof grade plywood veneer core for countertops to receive sinks and in "wet areas".
- .5 Laminating Adhesive: CSA-0112, water resistant type.
- .6 Draw Bolt Fasteners: 'K&V 516' by Knappe & Vogt Canada. No substitutions allowed.



- .6 Rough Hardware:
  - .1 Provide required rough hardware to frame and fix all finished carpentry and include for expansion shields, nails, spikes, screws, bolts, anchors, clips, plates, washers, rods, wires, wall brackets, chrome finishing trim, and other ironmongery which may be required. All wood screws shall be drill thread screws except at chipboard where self-tapping screws shall be used. All rough hardware shall be galvanized unless otherwise noted.
- .7 Cabinet Hardware: All cabinet hardware shall in general, conform to CAN/CGSB-9.25, ANSI/BHMA A156.9-1982 and shall be as follows:
  - .1 Acceptable manufacturers supplying cabinet hardware:
    - .1 Stanley Hardware
    - .2 Knappe & Vogt Canada
    - .3 Hafele Canada Inc.
  - .2 Door/Drawer Pulls: 24mm (15/16") diameter x 100mm (4") centre to centre with 33mm (1-5/16") projection, solid aluminum "bow" type door/drawer pulls with matching bases, having "US28" finish and complete with mounting screws.
  - .3 Adjustable Steel Standards and Supports: Nickel plated steel, adjustable on 13mm (1/2") centres. Standards at 151mm (6") from top and bottom. One support per 305mm (12") length of standard.
  - .4 Hinges: 95 deg opening, self-closing, concealed casework type hinges for overlay doors, having dual adjustable with heat tempered steel working parts with bright nickel finish (US14).
  - .5 Silencers: Round vinyl, self-adhering type silencers. Provide 2 per door.
  - .6 Drawer Slides: Full extension, side mounting, zinc coated, steel ball bearing, medium duty rated.
  - .7 Cabinet Locks: Single and double door cabinet cylinder locks to suit conditions by Best Lock Corporation. Co-ordinate keying with the Owner/Tenant.
  - .8 Magnetic Catches: Cast aluminum type.
- .8 Wall Mounted Standards and Brackets:
  - .1 Basis of Design Manufacturer: Knappe & Vogt Canada.
  - .2 Wall Mounted Standards: 22mm (7/8") wide x 17.5mm (11/16") high 12 gauge heavy-duty wall mounted standards with 50mm (2") slot adjustment, 914mm (3') long and capable of supporting 65 lbs./100 sq.ft.
  - .3 Brackets: 305mm (12") heavy-duty steel brackets with single, moulded nylon cam lock lever.
  - .4 Shelf Rests: Provide end, centre and front type shelf rests, complete with rubber cushions as required and for joining 2 shelves on one bracket.
- .9 Accessories:
  - .1 Garment Hooks: 133mm (5-1/4") high with 75mm (3") projection, institutional type garment hooks with bright chrome finish complete with mounting screws, '2038 CHR' by Knappe & Vogt Canada.
  - .2 Closet Rods: Extension type zinc coated steel closet rods with zinc coated forged steel end brackets and 2 centre supports, 1524mm to 2438mm (60" to 96") extension type, complete with mounting screws, 'KV2 ZC' by Knappe & Vogt Canada.

## 2.2 FABRICATION AND WORKMANSHIP

- .1 Work shall be executed by skilled carpenters under the supervision of a competent carpentry foreman. All items shall be shop assembled, insofar as is practical. Unless indicated otherwise comply with AWMAC Custom Grade requirements.
- .2 Make thorough examination of drawings and details, check anchorage, interfacing with work of other sections and other factors influencing the installation of the work, and be fully cognizant of requirements.
- .3 Finished woodwork shall be free from bruises, blemishes, mineral marks, knots, shakes and other defects and shall be selected for uniformity of colour, grain and texture.
- .4 Be responsible for methods of construction and for ensuring that materials are rigidly and securely attached and will not be loosened by the work of other sections.
- .5 Fabricate the work in a manner which will permit expansion and contraction of the materials without visible open joints.
- .6 Mitre exposed corners; no end grain shall be visible in completed installation.
- .7 Provide solid wood edging at exposed plywood edges.
- .8 Jointing of shop assembled work shall be by means of mortise and tenons, dowels, stub tenons, dovetails, dadoes, lock joints as applicable for the jointing condition.
- .9 Accurately cut, mitre, fit and frame work together to produce tight hairline joints, rigidly secured together in a permanent manner using glue, blind screw fixing or nails. Use concealed glue blocks for additional strength where possible.
- .10 Finished woodwork shall be in one piece wherever possible and all trim shall be in long lengths. Where jointing is necessary in the length, the joints between pieces shall be scarfed, glued and properly fastened. The material being jointed shall match reasonably well for grain and colour where natural finish is specified. Joints between lengths where paint finish is to be applied may be finger jointed in lieu of scarfing. Trim shall be accurately cut and mitred at all corners, glued and properly fastened.
- .11 Machine dressed work shall be properly machine using sharp cutters, the finished work shall be free from drag, feathers, slivers or roughness of any kind. Remove machine marks by sanding.
- .12 Finished woodwork shall be carefully hand sanded after installation to remove roughness and planer marks. Sanding shall be done with the grain of the wood and finished with fine grit paper to leave a smooth scratch-free surface suitable to receive the paint or natural finishes to be applied over as specified in Section 09 90 00.
- .13 Nail heads in the finished surfaces shall be set with straight shank nail sets. Screw and bolt heads in finished surfaces shall be let into the work and capped with edge grain wood caps dressed and finished flush.
- .14 Provide cutouts for sinks, fixtures, fittings, inserts, outlet boxes, services, other mechanical and electrical items and appliances. Round corners, and chamfer edges. Where items for cutouts butt to underside or back of finished surface, finish exposed edge to match face. Where item covers cutout, and at all concealed cut edges of core material, apply uniform coating of seal to cut edges.
- .15 The finished work shall be of a high quality, with all corners having exact angles to ensure no swerve or twisting. All bends, crimps or angle parts shall be produced by professional equipment and tools for this purpose and if long runs or repeats are required, such shall be produced in the shop, or have proper equipment on site.
- .16 Counters, Cabinets and Fitments:
  - .1 Provide and install counters, cabinets, and fitments as indicated on drawings.
  - .2 Shop fabricate and finish countertops and cabinet work in as large a size as practical. Verify field dimensions and conditions prior to fabrication.

- .3 Make each unit rigid and self-supporting, suitable for individual removal. Assemble components with dovetail connections, mortise and tenon or blind dado joints, and adequately glued and secured with screws.
- .4 Construct cabinets of solid lumber framing, with 19mm (3/4") plywood gables. Provide 19mm (3/4") plywood bottoms. Provide minimum 6mm (1/4") thick plywood full width backs having joints concealed behind framing. Backs which support shelves, equipment, or other loads, shall be 19mm (3/4") thick plywood. Route backs into end gables.
- .5 Fabricate cabinet base in wood, separately in height indicated or, if not indicated, to match flooring base.
- .6 Fabricate cabinet doors of flush panels from 19mm (3/4") thick plywood framed with hardwood edging.
- .7 Make drawer fronts of 19mm (3/4") finished plywood, and wide enough to cover slide space. Provide 13mm (1/2") drawer backs, 16mm (5/8") sides, 6mm (1/4") dividers, and 6mm (1/4") bottoms, all of finished plywood. Fasten sides to fronts with dovetail joints, and grooved and glued joints for backs. Groove and glue bottoms into fronts and sides.
- .8 Drawers shall be supported and guided with side extension drawer slides.
- .9 Where a locking drawer is located below another drawer, provide 6mm (1/4") thick plywood diaphragm in framing immediately above locking drawer.
- .10 Fabricate shelving of 19mm (3/4") finished plywood. Route cabinet gables to receive fixed shelving where indicated and to receive recessed metal shelf standards flush with adjacent surfaces for adjustable shelving.
- .11 Fabricate countertops to details shown of 3/4" plywood, unless otherwise indicated on the Drawings as quartz countertops.
  - .1 Provide exterior grade waterproof Douglas Fir plywood for countertops to receive sinks. Fit corners and edges of countertops with solid stock. Extend side and backsplashes to heights indicated. Provide side returns to match backsplashes at all abutting fixed vertical surfaces.
- .12 Support counters without cabinets below on solid wood framing, and plywood gables.
- .13 Provide plywood shelf units with finished plywood cleats for shelving and coat rod installations. Provide closet rods with end flanges and intermediate supports.
- .17 Edging Treatment:
  - .1 Provide Self Edge Laminate: HPDL, colour matching cabinet work, as indicated on the Drawings.
- .18 Plastic Laminate Covered Components:
  - .1 Meet requirements of CAN3-A172, Appendix A.
  - .2 Bond plastic laminate to core with adhesive using pressure. Provide balanced construction with plastic laminate face sheet on exposed sides of core and backer/liner sheet. Finish drawers with liner sheet on both sides of core for balanced construction.
  - .3 Unless otherwise detailed, provide 19mm (3/4") thick core.
  - .4 Apply plastic laminate to core material in accordance with adhesive manufacturer's instructions. Provide same core and laminate profiles to provide continuous support and bond over entire surface.
  - .5 Use continuous lengths up to 2439mm (8'). Keep joints 610mm (2') from cutouts and in locations indicated on reviewed shop drawings.

- .6 Locate joints, where required at 2439mm to 3048mm (8' to 10') O.C. At L-shaped corners mitre plastic laminate, to the outside corner. Accurately fit members together to provide tight and flush butt joints, in true planes. Provide 6mm (1/4") blind spline and approved type draw bolts; one draw bolt for widths up to 150mm (6") at maximum 457mm (18") centres for widths exceeding 150mm (6"). Colour-match adjoining units.
- .7 Form shaped profiles and bends using postforming grade laminate to laminate manufacturer's instructions.
- .8 Where curved or bent surfaces are required for counters, backsplashes and other areas, use postforming laminate.
- .9 Self-edge straight-line-edging with general purpose laminate and radius corners with postforming laminate, of same colour and finish as facing sheet, to cover exposed edges of core material. Apply with same adhesive as facing sheet. Chamfer edges uniformly at approximately 20 deg using machine router. Do not mitre laminate edges.
- .10 Fabricate horizontal wearing surfaces including counters, shelves, both sides of removable shelves, cabinet doors and drawer fronts, of general purpose laminate except where postforming is required.
- .11 Use general purpose laminate for exposed vertical surfaces except where otherwise specified or indicated.
- .12 Apply plastic laminate backing sheet to reverse side of core of plastic laminate finished work including under counter tops and concealed portions of plastic laminate faced work. Provide backing sheet of specified minimum thickness, increased as required to compensate stresses caused by facing sheet.
- .13 Apply laminated plastic liner sheet to interior of cabinetry unless indicated otherwise.
- .14 Where cutouts are required in countertops for items that butt to underside of top only, trim edges of opening with postforming laminate. Use radiused corners and chamfer edges around cutouts to avoid chipping laminate. Where item covers cutout, apply uniform coating of sealer to cut edges.
- .15 Assemble work, true and square. Arrange adjacent parts of continuous laminate work to match in colour and pattern.

### **2.3 MOISTURE CONTENT**

- .1 Moisture content of interior woodwork shall be between 8% and 12%.

### **2.4 FINISHES**

- .1 Finishes shall match approved finished samples of wood treatment submitted by this section for each species of wood required. Wood items provided under this section shall be finished as part of the work of this section.
- .2 Provide finishes as indicated on drawings and scheduled, in accordance with requirements of Section 09 90 00.

## **3 Execution**

### **3.1 EXAMINATION**

- .1 Inspect available spaces and check surfaces over which the work of this section is dependent for any irregularities detrimental to the application and performance of the work. Notify Consultant in writing of all conditions which are at variance with those on the Contract Documents and/or detrimental to the proper and timely installation of the work of this section. The decision regarding correct measures shall be obtained from the Consultant prior to proceeding with the affected work.
- .2 Check humidity in building with moisture reading instruments if doubt exists that building is sufficiently dry and ready to receive millwork. Do not proceed until unsatisfactory conditions are corrected.

- .3 Commencement of work indicates acceptance of surfaces and conditions.

### **3.2 INSTALLATION - GENERAL**

- .1 Provide and fit in place all furring, strapping, battens, grounds and blocking required to provide adequate properly placed fixing for all finish carpentry work and as required for the work of other sections.
- .2 Refer to drawings and coordinate with drywall, the painting and floor covering sections to establish sequence of installation or execution of each others' work. Pay particular attention to areas where materials are supplied by others and installed under this Contract.
- .3 All nails where their use is permitted, shall be long enough so that at least half their length penetrates into the second member. Splitting of wood members shall be minimized by staggering the nails in the direction of the grain and by keeping nails well in from edges.
- .4 Unless otherwise permitted by Consultant, fasten finish carpentry components in concealed manner.
- .5 Plastic laminate work shall be free of cracks and chipped or broken edges. Replace damaged components.
- .6 Fitments shall be installed level, plumb and true and complete in all respects.
- .7 Fit small scribe moulds of same material as fitment to hide voids at junction of fitment to fitment and fitment to walls, partitions, ceilings, furrings.
- .8 Provide and install all pass-thru doors, cable entry plugs, computer paper feed slot guides, casters, wall mounted standards with brackets and accessories as indicated on drawings, secure, plumb, level and true to line to adjacent surfaces and items.

### **3.3 PRIMING**

- .1 Immediately in instances where primed work is cut (as for fitting), a coat of primer shall be applied to the resulting raw surfaces.

### **3.4 INSTALLATION - CABINET HARDWARE**

- .1 Install cabinet hardware in shop wherever possible.
- .2 Install cabinet hardware secure, plumb, level, true to line, and in accordance with hardware manufacturers' instructions.
- .3 Cut and fit to finish carpentry and millwork for proper installation and operation of cabinet hardware.
- .4 Size cutouts so that hardware item completely covers cutouts.
- .5 Adjust and lubricate cabinet hardware as required for smooth and efficient operation without binding.

### **3.5 INSTALLATION - FINISHING HARDWARE**

- .1 Take delivery of all finishing hardware and install. Check each item as received.
- .2 Set, fit and adjust hardware according to manufacturer's directions at heights directed by Consultant. Hardware shall operate freely. Protect installed hardware from damage and paint spotting.
- .3 Install all hardware for hollow metal doors including hinges. Prepare wood doors for installation with required bevels, clearances and mortices for hardware. Install wood doors, door grilles and all applicable hardware.
- .4 Pre-drill kickplates and doors before attachment of plates. Apply with water-resistant adhesive and countersunk stainless steel screws.

**3.6 INSTALLATION - HOLLOW METAL DOOR FRAMES**

- .1 Receive hollow metal door frames from Section 08 11 13. Set frames in place, temporarily brace until built-in to adjacent construction. Remove bracing following permanent anchorage.
- .2 Co-operate with other Sections in locating frames. Shim up where required to ensure proper alignment and dimensions from finished floor to door head.

**3.7 INSTALLATION - HOLLOW METAL DOORS**

- .1 Fit, hang and adjust plumb and true, maintaining uniform widths and heights. Fit all hardware and adjust for ease of operation. Leave 1/8" clearance at heads and jambs and 3/8" at sills.
- .2 Re-adjust and check doors upon completion of the building. Correct any restriction to free action of door.
- .3 If lock or latch sets are installed before doors receive final finish by painter, remove such hardware prior to painter's work and re-install when finish completed.
- .4 Where door frames are not satisfactory for the proper installation of doors, correct condition prior to installation.

**END OF SECTION**

1 General

**1.1 SUMMARY**

- .1 Supply and install materials in accordance with published 'Through-Penetration Firestop Systems' in UL's Fire Resistance Directory or the publication of another approved independent laboratory.

**1.2 RELATED REQUIREMENTS**

- .1 Section 07 92 00: Sealants
- .2 Section 09 21 16: Gypsum Wallboard
- .3 Contractor shall be responsible for coordinating this section with all related sections.

**1.3 REFERENCE STANDARDS**

- .1 Underwriters Laboratories of Canada (ULC):
  - .1 CAN/ULC S115-05, Standard Method of Fire Tests and Firestop Systems
- .2 American Society for Testing and Materials (ASTM):
  - .1 ASTM E814-11a, Standard Test Method for Fire Tests of Penetration Firestop Systems

**1.4 SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00.
- .2 Shop Drawings:
  - .1 Provide details indicating all reinforcing, anchorages, fastening and proposed method of installation for the various conditions within the project.
- .3 Samples:
  - .1 Submit samples of each type of firestop and smoke seal material and accessory.

**1.5 QUALITY ASSURANCE**

- .1 Applicator shall be licensed by the manufacturer of fireproofing materials.
- .2 Conform to flame and temperature ratings established by ULC CAN4-S115-05 and ASTM E814-11a.
- .3 Submit manufacturer's certification that materials meet or exceed specified requirements.
- .4 Maintain flame and temperature ratings equal to surrounding materials.

**1.6 DELIVERY, STORAGE, HANDLING AND PROTECTION**

- .1 Deliver materials in original, unopened packages bearing name of manufacturer and product identification.
- .2 Store materials off ground, under cover, and away from damp surfaces.

**1.7 SITE CONDITIONS**

- .1 Do not apply materials when temperature of substrate material is below 4 deg C and surrounding air temperature is below 4 deg C, for 24 hours prior to application.

2 Products

**2.1 MATERIALS**

- .1 Bears UL, ULC or Warnock Hersey label and confirmation of compliance with ASTM E814-11a or CAN4-S115.
- .2 Provide fire stopping and smoke sealing systems in accordance with CAN4-S115-M and shall also conform to special requirements in part 3.5 of the Building Code.

- .3 Fire-resistant rating of fire stopping material assemblies must meet or exceed the fire-resistance rating of the floor or wall section being penetrated.
- .4 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control shall be elastomeric seal type. Do not use a cementitious, or rigid seal at such locations.
- .5 Primers shall be to manufacturer's recommendation for specific material, substrate, and end use.
- .6 Damming and backup materials, supports and anchoring devices shall be to manufacturer's recommendations, and in strict accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
- .7 Sealants for vertical joints, shall be non-sagging type.

### 3 Execution

#### 3.1 PROTECTION

- .1 Mask adjacent work of other Sections as necessary to avoid spillage onto adjoining surfaces. Remove stains on adjacent surfaces as required.

#### 3.2 PREPARATION

- .1 Examine sizes and conditions to establish correct thickness and installation of backup materials. Ensure surfaces are dry and frost free.
- .2 Clean bonding surfaces of deleterious substances including dust, paint, rust, oil, grease and other foreign matter which may otherwise impair effective bonding.
- .3 Do not apply firestops and smoke seals to surfaces previously painted or treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .4 Prepare surfaces in accordance with manufacturer's instructions.
- .5 Priming and Sealing: Prime surfaces in accordance with manufacturer's instructions.

#### 3.3 APPLICATION

- .1 Mix materials in accordance with manufacturers' written instructions.
- .2 Apply in strict accordance with ULC certification and manufacturer's recommendations to provide a temperature and flame rated seal equal as a minimum to the rating of the wall or floor surrounding.
- .3 Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
- .4 Seal all joints to ensure an air and water resistant seal, capable to withstand compression due to thermal, wind or seismic joint movement.
- .5 Consult with Mechanical Engineer and project manager prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
- .6 Apply to mechanical and electrical service through-penetrations, to formed, sleeved, or cored openings in smoke and fire rated masonry, or gypsum wallboard stud walls and structural floors and ceilings.
  - .1 Coordinate with plumbing, HVAC and electrical contractors to ensure proper firestopping application, providing smoke seal around penetrations through fire rated assemblies. Ensure that end joints between lengths of firestopping material have been properly sealed.
- .7 Apply to head of smoke and fire rated gypsum wallboard stud wall abutting underside of structure (concrete or steel deck).
- .8 Apply to control joints in rated stud walls.



- .9 Apply to penetrations for passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire rated vertical barriers (walls and partitions), horizontal beams (floor/ceiling assemblies) and vertical service shaft walls and partitions.
- .10 Apply to safining slots gaps between edge of floor slabs and curtain walls.
- .11 Apply to openings between structurally separate sections of walls and floors.
- .12 Apply to gaps between tops of walls and ceiling or roof assemblies.
- .13 Apply to expansion joints in fire rated walls and floors.
- .14 Apply to openings and penetrations in fire rated partitions or walls containing fire doors.
- .15 Apply to openings around structural members which penetrate fire rated floors or walls.
- .16 Apply firestop and smoke seal materials in accordance with manufacturer's directions, with sufficient pressure to properly fill and seal openings.
- .17 Tool or trowel exposed surfaces.
- .18 Remove excess compounds promptly as work of this Section progresses and upon completion of work of this Section.

### **3.4 CURING**

- .1 Cure materials in accordance with manufacturer's instructions.
- .2 Do not cover up materials until proper curing has taken place.

### **3.5 IDENTIFICATION**

- .1 Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
  - .1 The words: "Warning: Through-Penetration Firestop System - Do Not Disturb"
  - .2 Contractor's name, address and telephone number.
  - .3 Designation of applicable testing and inspection agency.
  - .4 Date of installation.
  - .5 Manufacturer's name for firestop materials.

### **3.6 CLEAN UP AND REPAIRS**

- .1 Clean adjacent surfaces immediately and leave work neat and clean.
- .2 Remove excess materials using recommended procedures, as work progresses.
- .3 Remove dams after initial set of firestops and smoke seals as required.
- .4 Correct staining and discolouring of adjacent surfaces as directed by Consultant.
- .5 Remove all debris and excess materials entirely from the site and leave the work in a neat and tidy condition.
- .6 Perform one simulated smoke test for each penetration type once per day. Simulate smoke at a rate of four seconds/100 cubic feet (2.8 cubic metres) and maintain the fog density until inspection is complete.
- .7 After inspection is complete, repair all defective firestopping and smoke seals and test again. Continue this procedure until all firestopping and smoke seals passes test.

**END OF SECTION**

1 General

**1.1 SUMMARY**

- .1 Read other Sections of the Specification for extent of sealant specified in those Sections. Do all other sealing indicated, specified or required.
- .2 Provide all items, articles, materials, operations or methods listed, mentioned or scheduled on drawings and/or herein, including all labour, materials, equipment and incidentals necessary and required for the completion of the sealant.

**1.2 RELATED REQUIREMENTS**

- .1 Section 05 50 00: Miscellaneous Metals
- .2 Section 06 10 00: Rough Carpentry
- .3 Section 07 84 00: Firestopping and Smoke seals
- .4 Section 08 11 13: Steel Doors and Frames
- .5 Section 08 41 13: Aluminum Framed Entrances and Storefronts
- .6 Section 09 21 16: Gypsum Wallboard
- .7 Section 09 90 00: Painting

**1.3 REFERENCE STANDARDS**

- .1 American Society for Testing and Materials (ASTM):
  - .1 ASTM C509-06(2011), Standard Specifications for Elastomeric Cellular Performed Gasket and Sealing Material
  - .2 ASTM C920-11, Standard Specification for Elastomeric Joint Sealants
  - .3 ASTM C-1382-11, Standard Test Method for Determining Tensile Adhesion Properties of Sealants when Used in Exterior Insulation and Finish Systems (EIFS) Joints
  - .4 ASTM D2240-05(2010), Standard Test Method for Rubber Property - Durometer Hardness
- .2 Canadian General Standards Board (CGSB):
  - .1 CAN/CGSB-19.13-M87, Sealing Compound, One-Component, Elastomeric, Chemical Curing

**1.4 SUBMITTALS**

- .1 Provide submittals in accordance with the General Conditions and Section 01 33 00.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
  - .1 Manufacturer's Data: Submit manufacturer's literature describing each material to be used in the work of this Section. Literature shall contain a statement that the material complies with the specified standard.
  - .2 Samples: Submit for approval and colour selection sample of each type of compound, recommended primers and joint filler or fillers proposed to be used.
  - .3 Mock-Up:
    - .1 If requested by the Consultant, construct mock-ups where directed to show location, size, shape, colour and depth of joints complete with back-up material, primer and sealant. Mock-up may be part of finished work.
    - .2 Allow 24-hours for inspection of work before proceeding with work.

- .4 Safety Data Sheets: Submit WHMIS safety data sheets for inclusion with project record documents. Keep one copy of WHMIS safety data sheets on Site for reference by workers.

### 1.5 QUALITY ASSURANCE

- .1 Adhere to Manufacturer's recommendations for mixing or preparation of materials listed in this Section.
- .2 Pot life or installation times shall not be exceeded.
- .3 Integral materials which compose a joint detail shall be compatible.
- .4 Component parts, where possible, shall have the same manufacturer.
- .5 A representative of sealant material manufacturer shall visit the site during application to ensure that all Work is carried out according to the manufacturer's printed instructions.

### 1.6 SITE CONDITIONS

- .1 Apply sealants only to completely dry surfaces, and at air, substrate and material temperatures above minimum established by manufacturer's written specifications.

### 1.7 DELIVERY, STORAGE HANDLING AND PROTECTION

- .1 Deliver all materials to the jobsite in their original, unopened containers, with all labels intact.
- .2 Receive and store materials as recommended by materials manufacturer.
- .3 Maintain containers and labels in undamaged condition.

### 1.8 WARRANTY

- .1 Provide a written warranty endorsed and issued in the name of the Owner stating that all sealant work of this Section is warranted against leakage, cracking, crumbling, melting, running, deterioration, shrinkage, loss of cohesion, loss of adhesion, staining of adjoining or adjacent work or surfaces, or failure to provide intended seal for a period of five (5) years from the Date of Substantial Performance of the Work, and that any defects will be made good including, related materials and installation at no additional cost to the Owner.

## 2 Products

### 2.1 MATERIALS

- .1 Joint Cleaner:
  - .1 Non-corrosive solvents as recommended by sealant manufacturer for applicable substrate material(s).
- .2 Primer:
  - .1 Non-staining type as recommended by sealant manufacturer, for use on substrate conditions outlined, and compatible with specified sealant being applied.
- .3 Joint Back-Up – Backer Rod:
  - .1 Round, open cell, reticulated foam, 50% compression, compatible with sealant and primer, non-adhering to sealant.
- .4 Bond Breaker:
  - .1 Pressure sensitive plastic tape, not bondable to sealant as recommended by sealant manufacturer.
- .5 Sealant Type "A" – Joints around Interior Door Frames, Windows and Under Exterior Thresholds:
  - .1 One-part, low or medium modulus, neutral curing 100% silicone joint sealant, conforming to ASTM C920-11, Type S, Grade NS, Class 35.
    - .1 DC CWS by Dow Corning.

- .2 SWS by GE
- .3 SikaSil WS-305CN by Sika
- OR
- .2 One component, low modulus, moisture curing, polyurethane joint sealant, conforming to ASTM C920-11, Type S, Grade NS, Class 25.
  - .1 Dymonic FC by Tremco Ltd., division of RPM Company.
  - .2 Sikaflex 1A by Sika Canada Inc.
  - .3 Sonolastic NP1 by BASF.
  - .4 Pourthane NS by W.R MEADOWS
- .6 Sealant Type "B" – Expansion / Control Joints:
  - .1 One-part, ultra low modulus, non-staining neutral curing 100% silicone joint sealant, conforming to ASTM C920-11, Type S, Grade NS, Class 50.
    - .1 DC 790 by Dow Corning.
    - .2 Spectrem 1 by Tremco
    - .3 SCS2700 SilPruf LM by GE
    - .4 SikaSil WS-290 by Sika
- .7 Sealant Type "E" – Mould and Mildew Resistant:
  - .1 Mould and mildew resistant, Shore A Hardness 15-25, conforming to ASTM C920-11, Type S, Grade NS, Class25, use NT, G, and A:
    - .1 SCS1700 by GE
    - .2 DC 786 by Dow Corning
    - .3 Tremsil 200 by Tremco
    - .4 Omni Plus by Sonneborn
    - .5 SikaSil –GP by Sika
- .8 Sealant Type "F" – Glazing Joints:
  - .1 Silicone Sealant: Butt glazing, one part, moisture curing, shore A hardness 15-25, conforming to CAN/CGSB-19.13-M, Classification C-1-40-B-N and C-1-25-B-N and ASTM C920-11, Type S, Grade NS, Class 25, use NT, G, A, O; Colour: clear (translucent):
    - .1 DC 795 by Dow Corning
    - .2 SCS2000 by GE.
    - .3 Multiseal by Chemtron.
    - .4 Spectrum 2 by Tremco
    - .5 SikaSil WS-295 by Sika
- .9 Sealant Type "H" – Saw Cut Sealant:
  - .1 Multi-component, self-levelling, conforming to ASTM D2240-05(2010):
    - .1 Tremco Control Joint Sealant
    - .2 BASF Masterfill 300
    - .3 Sika Loadflex
    - .4 Rezi-Weld Flex by W.R MEADOWS

- .10 Sealant Type "I" – HVAC Sealant:
  - .1 One-part, RTV, acetoxy-cure silicone sealant for heating, ventilation, air conditioning and refrigeration applications:
    - .1 Dow Corning HVAC Silicone Sealant
- .11 Sealant Type "J" – Electrical Sealant:
  - .1 One-part, white, non-flowing moisture cure adhesive for electrical applications:
    - .1 Dow Corning 738 Electrical Sealant
- .12 Preformed Compression Seal:
  - .1 Compartmental open cell neoprene extrusion type conforming to ASTM C509-06(2011), complete with liquid lubricant adhesive recommended by manufacturer.

### 3 Execution

#### 3.1 INSPECTION

- .1 Verify at site that joints and surfaces conditions provided will not adversely affect execution, performance or quality of completed work.
- .2 Ensure masonry and concrete have cured 28 days minimum.
- .3 Ascertain that sealers and coatings applied to substrates are compatible with sealant used and that full bond of the sealant and substrate is attained. Request samples of the sealed or coated substrate from their fabricators for testing of compatibility and adhesion, if necessary.
- .4 Verify that specified recommended environmental conditions are present before commencing work.
- .5 Defective work resulting from application to unsatisfactory joint conditions will be considered the responsibility of those performing the work of this section.
- .6 Do not start work of this Section until conditions are satisfactory.

#### 3.2 PREPARATION

- .1 Clean joint surfaces using joint cleaner as necessary, to remove dust, paint, loose mortar, and other foreign matter and dry joint surfaces.
- .2 Remove dust, silt, scale and coatings from ferrous metals by wire brush, grinding or sandblasting.
- .3 Remove oil, grease and other coatings from non-ferrous metals with approved cleaning solvent.
- .4 Ensure surfaces are free of frost, rust, lacquers, laitance, release agents, moisture or other matter which might adversely affect adhesion of sealant.
- .5 Examine joint sizes and correct as required to allow for anticipated movement and to achieve proper width/depth ratio per manufacturer's written recommendations for specified sealant.
- .6 Support joint filler on horizontal traffic surfaces against vertical movement which might result from traffic loads or foot traffic.
- .7 Prepare surfaces as recommended by sealant manufacturer.
- .8 Fully remove existing sealant scheduled to be removed and replaced with new sealant, in areas indicated on the Drawings.
  - .1 Follow manufacturers procedures for removal of existing sealant and test areas for adhesion of new sealant. Provide the Consultant with field report identifying results of adhesion testing.
- .9 Install joint backing material or apply bond breaker tape to achieve correct joint depth and prevent three-sided adhesion.
- .10 To protect adjacent surfaces, mask adjacent surfaces with tape prior to priming and/or sealing.

- .11 Prime sides of joints using two cloth method in accordance with manufacturer's directions immediately prior to sealing.
- .12 Before any sealing is commenced, a test of the material shall be made for indications of staining, poor adhesion or other undesirable effects.
- .13 Seal joints in surfaces to be painted before painting. Where surfaces to be sealed are prime painted in shop before sealing, check to make sure prime paint is compatible with primer and sealant. If incompatible inform Consultant, consult the manufacturer, and change primer and sealant to approved compatible types.
- .14 Check form release agent used on concrete for compatibility with primer and sealant. If incompatible inform Consultant and change primer and sealant to approved compatible types or clean concrete to Consultant's approval.

### **3.3 APPLICATION**

- .1 Apply sealant in accordance with manufacturer's directions, using a gun with proper nozzle size, ensuring to fill voids and joints completely, to leave a weathertight, airtight installation. Superficial pointing with skin bead is not acceptable.
- .2 Neatly tool surface to a slight concave profile. Surface of sealant shall be smooth, free from ridges, wrinkles, sags, air pockets and embedded impurities.
- .3 Clean adjacent surfaces immediately and leave Work neat and clean. Remove excess sealant and droppings, using recommended cleaners as Work progresses. Remove masking tape after tooling of joints.

### **3.4 CLEANING AND PROTECTION**

- .1 Remove all waste materials from site. Sealant shall be cleaned of all foreign material as recommended by the sealant manufacturer. Leave work in a condition satisfactory to the Consultant.

**END OF SECTION**

1 General

**1.1 SUMMARY**

.1 This Section includes requirements for supply and installation of the following:

- .1 Interior Steel Doors
- .2 Interior Steel Door Frames
- .3 Sidelight Frames

**1.2 RELATED REQUIREMENTS**

- .1 Section 07 92 00: Sealants
- .2 Section 08 70 00: Hardware
- .3 Section 08 80 00: Glazing
- .4 Section 09 90 00: Painting

**1.3 DEFINITIONS**

- .1 Base Metal Thickness: Thickness dimensions are minimums as defined in referenced ASTM standards for both uncoated steel sheet and the uncoated base metal of metallic coated steel sheets.
- .2 Opening Sizes: Door sizes indicated on Drawings are considered nominal dimensions, measured from frame rabbet width and height, with allowances for nominal clearances between head, jamb and door bottom in accordance with CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames.

**1.4 REFERENCES**

- .1 American National Standards Institute (ANSI):
  - .1 ANSI/SDI A250.7-1997 (R2002), Nomenclature for Standard Steel Doors and Steel Frames
  - .2 ANSI/SDI A250.11-2001, Recommended Erection Instructions for Steel Frames.
- .2 American Society for Testing and Materials (ASTM):
  - .1 ASTM A653/A653M-11, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  - .2 ASTM A879/A879M-12, Standard Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface
  - .3 ASTM A924/A924M-10a, Standard Specification for General Requirements for Sheet Steel, Metallic-Coated by the Hot-Dip Process.
- .3 Canadian General Standards Board (CGSB):
  - .1 CAN/CGSB 1.132-M90, Primer, Zinc Chromate, Low Moisture Sensitivity
  - .2 CAN/CGSB 41-GP-19Ma-78(1984), Rigid Vinyl Extrusions for Windows and Doors
  - .3 CAN/CGSB 82.5-M88, Insulated Steel Doors
- .4 Canadian Standards Association (CSA):
  - .1 CSA W59-03 (R2008), Welded Steel Construction (Metal Arc Welding)
- .5 Canadian Steel Door Manufacturers Association (CSDMA):
  - .1 Recommended Dimensional Standards for Commercial Steel Doors and Frames, 2007

## 1.5 SUBMITTALS

- .1 Provide requested information in accordance with Section 01 33 00.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
  - .1 Product Data:
    - .1 Submit product data for each type of door and frame indicated, include door designation, type, level and model, material description, core description, construction details, label compliance, and finishes.
  - .2 Shop Drawings:
    - .1 Show each type of frame, door, hardware blanking, reinforcing, tapping and drilling arrangements, metal gauges, thicknesses and finishes.
    - .2 Show details of doors including vertical and horizontal edge details.
    - .3 Submit door and frame schedule identifying each unit. Each unit shall bear a legible identifying mark corresponding to that listed in the door and frame schedule.
  - .3 Samples:
    - .1 Supply for Consultant's review, if requested, sample of frame corner showing construction, workmanship and finish.
  - .4 Informational Submittals: Provide the following submittals when requested by the Consultant:
    - .1 Source Quality Control Submittals: Submit information on zinc coating treatment and primer spot treatment, including instructions for surface treatment before site painting and any restrictions or special coating requirements.

## 1.6 QUALITY ASSURANCE

- .1 Manufacturer: Obtain hollow metal doors and frames from single source of supply and from a single manufacturer, and as follows:
  - .1 Fabricate work of this Section to meet the requirements of the Canadian Steel Door and Frame Manufacturer's Association, Manufacturing Specification for Doors and Frames as a minimum, and as further modified in this section.
  - .2 Fabricator shall be a member in good standing of the Canadian Steel Door and Frame Manufacturer's Association.
- .2 Supplier: Obtain hollow metal doors and frames from single source of supply and from a single manufacturer.
- .3 Installer: Use installers who are experienced with the installation of hollow metal doors and frames of similar complexity and extent to that required for the Project.

## 1.7 DELIVERY, STORAGE AND HANDLING

- .1 Coordinate deliveries to comply with construction schedule and arrange ahead for off-the-ground, under cover storage location. Do not load any area beyond the design limits.
- .2 Adequately protect units against rust and damage during manufacture, delivery and storage.
- .3 Store materials on planks in a dry area and cover to protect from damage. Make good immediately any damage done. Clean scratches and touch-up with rust-inhibitive primer.



## 1.8 SITE CONDITIONS

- .1 Site Measurements: Verify actual dimensions of openings by site measurements before fabrication and indicate measurements on shop drawings; coordinate fabrication schedule with construction progress to avoid delaying the Work.
- .2 Established Measurements: Establish dimensions and proceed with fabricating doors and frames without site measurements where site measurements cannot be made without delaying the Work; coordinate construction to ensure that actual site dimensions correspond to established dimensions.

## 2 Products

### 2.1 MATERIALS

- .1 Sheet Steel:
  - .1 Interior Doors and Frames (Normal Humidity): Electrolytic zinc coated steel sheets in accordance with ASTM A879/A879M-12, Commercial Steel (CS), Class B coating; mill phosphatized; suitable for unexposed applications; stretcher levelled standard of flatness.
  - .2 Gauges:
    - .1 Door and Screen Frames:
      - .1 Gauge: 16 msg
    - .2 Doors (Honeycomb or Polystyrene Core):
      - .1 Door Faces:
        - .1 Gauge: 18 msg.
    - .3 Top and Bottom End Channels:
      - .1 Gauge: 18 msg.
    - .4 Reinforcements:
      - .1 Lock and Strike Reinforcements:
        - .1 Gauge: 16 msg.
      - .2 Hinge Reinforcements:
        - .1 Gauge: 10 msg.
      - .3 Flush Bolt Reinforcements:
        - .1 Gauge: 16 msg.
      - .4 Door Closer or Holder Reinforcements:
        - .1 Gauge: 12 msg.
- .3 Anchors:
  - .1 As required to suit condition.
- .4 Rubber Bumpers:
  - .1 3 per door.
- .5 Door Cores:
  - .1 Interior doors, except fire rated doors: Structural small cell; 1" maximum, kraft paper honeycomb; minimum weight 36 kg/ream; minimum density 16.5 kg/m<sup>3</sup>; sanded to required thickness.

- .6 Adhesives:
  - .1 Core Adhesive: Heat resistant, single component adhesive recommended by manufacturer.
- .7 Touch-Up Primer: Rust inhibitive primer meeting CAN/CGSB 1.132, touch up zinc coatings using shop applied primer; grey or red coloured primer, clear primer not acceptable; provide additional primer for site touch-up to repair damaged zinc and shop applied coatings.
- .8 Accessories:
  - .1 Glazing Stops:
    - .1 Glass mouldings: Formed steel having 1/32" metal core thickness, screw fixed.
    - .2 Accurately fit and butt at corners glazing trim and stops; located on secure side of door, or interior of room window frame.
  - .2 Sealant: As specified in Section 07 92 00.
  - .3 Glazing: As specified in Section 08 80 00.
  - .4 Door Silencers (Bumpers or Mutes): Manufacturer's standard black or grey neoprene silencers; three silencers on strike jambs of single door frames; two silencers on heads of double-door frames; stick on bumpers are not acceptable.

## 2.2 FABRICATION AND MANUFACTURE

- .1 Gauges of metal shall be as specified. No deviations or substitutions will be accepted
- .2 Reinforcing specified is the minimum acceptable. Provide additional reinforcement where required to ensure a permanent, rigid, trouble free installation able to withstand the stresses of heavy commercial usage.
- .3 Cut, shear, straighten and work the steel in manner to prevent disfigurement of the finished work.
- .4 Punch frames for rubber door bumpers.
- .5 Fill seams, joints and weld depressions with epoxy metal filler, disc sand to a smooth, flat, uniform scratch-free surface, with all arrises sharp and true to line. Drilled and punches holes shall be reamed and have all burrs removed.
- .6 Finished work shall be free of warp, open seams, buckles, weld and grind marks and other surface defects detrimental to the production of a good paint finish.
- .7 Fastenings shall be concealed except those required for loose glazing stops.
- .8 Welding shall conform to CSA W59-03 (R2008).
- .9 Hardware Requirements:
  - .1 Blank, mortise, reinforce, drill and tap doors and frames to receive templated hinges and other hardware as required. Check hardware lists for requirements.
- .10 Frames:
  - .1 Fabricate frames to profiles shown. Frames shall be fabricated to suite the header conditions of masonry work. Mitre corners of frames. Cut frame mitres accurately and weld continuously on inside of frame. Fabricate header frame to suit. Where site welding or splicing is required due to size of unit, the location of field joints shall be shown on the shop drawings and strictly adhered to.
  - .2 Protect strike and hinge reinforcements and other openings with mortar guard boxes welded to frame.
  - .3 Cutouts in doors for mortise lock sets shall be fitted with leaf spring clips and back limit stop to facilitate easy positioning and setting of locksets.
  - .4 Weld floor clip angles to inside of each jamb profile, two holes in each for anchorage to floor. Where required provide adjustable type floor clip angles.

- .5 Fit frames with channel or angle spreaders, two per frame, to ensure proper frame alignment. Install stiffener plates or spreaders between frame trim where required, to prevent bending of trim and to maintain alignment when setting and during construction.
- .6 Where frames occur in masonry provide and adjustable T-strap type or wire type anchor for every 2'-0" of jamb length. Special anchors for frames to be set in concrete shall be as detailed.
- .11 Doors:
  - .1 Fabricate doors to present one continuous face free from joints, tool markings and abrasions.
  - .2 Reinforce, stiffen honeycomb doors with small cell honeycomb core laminated to the inside faces of panels. The core shall completely fill the inside hollow of the door.
  - .3 Reinforce around frame openings required for glazing or louvers. Provide glazing stops with countersunk oval head screws.
  - .4 Reinforce door edges with channel reinforcing. Bevel stiles 1/8". Assemble by tack welding and fill.
  - .5 Provide cutouts in doors for glazed lites as indicated on drawings and schedules. Glazing stops shall be square formed steel in single piece lengths sized to suit. Accurately mitre corners and finish in proper plane. Secure stops in place with flush, countersunk screws.
- .12 Finishing
  - .1 Shop apply zinc rich primer to repair damaged zinc coatings arising from fabrication; cure primer fully before shipping to site; include compatible primer for site finishing and correction of surface abrasions to zinc coatings and factory applied primer.
  - .2 Remove weld slag and splatter from exposed surfaces.
  - .3 Fill and sand smooth tool marks, abrasions and surface blemishes to present smooth uniform surfaces.
- 3 Execution
- 3.1 EXAMINATION**
  - .1 Examine substrates, door swing arcs, areas of installation and conditions affecting installation for compliance with requirements for manufacturer's installation tolerances and other conditions affecting performance of work of this Section.
  - .2 Verify roughing-in for embedded and built-in anchor locations before installing frames.
  - .3 Verify door and frame size, door swing and ratings with door opening number before installing frames.
  - .4 Installation of hollow metal doors and frames will denote acceptance of site conditions.
- 3.2 INSTALLATION**
  - .1 Install steel doors, frames, and accessories in accordance with reviewed shop drawings, ANSI A250.11, CSDMA Installation Guide, manufacturer's data, and as specified in this Section.
  - .2 Door Frames:
    - .1 Remove temporary spreaders before installing door frames, leaving exposed surfaces smooth and undamaged.
    - .2 Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set; limit of acceptable frame distortion 1/16" out of plumb measured on face of frame, maximum twist corner to corner of 1/8"; align horizontal lines in final assembly.

- .3 Brace frames rigidly in position until adjacent construction is complete; install wooden spreaders at third points of frame rebate to maintain frame width, install centre brace to support head of frames 4' and wider in accordance with ANSI A250.1; do not use temporary metal spreaders for bracing of frames.
- .4 Install glazing materials and studded door silencers.
- .5 For frames over 1220mm (4') in width, provide vertical support at the centre of head.
- .3 Frame Tolerances: Install frames to tolerances listed in ANSI A250.11, and as follows:
  - .1 Squareness: Maximum 0.8mm (1/32") measured across opening between hinge jamb and strike jamb.
  - .2 Plumbness: Maximum 0.8mm (1/32") measured from bottom of frame to head level.
  - .3 Alignment: Maximum 0.8mm (1/32") measured offset between face of hinge jamb and strike jamb relative to wall construction.
  - .4 Twist: Maximum 0.8mm (1/32") measured from leading edge of outside frame rabbet to leading edge of inside frame rabbet.
- .4 Doors:
  - .1 Fit hollow metal doors accurately in frames within clearances required for proper operation; shim as necessary for proper operation.
  - .2 Install hardware in accordance with manufacturers' templates and instructions.
  - .3 Adjust operable parts for correct clearances and function.
  - .4 Install glazing materials and door silencers.
  - .5 Install louvers and vents.
- .5 Adjusting and Cleaning
  - .1 Immediately after installation, sand smooth any rusted or damaged areas of prime coat and apply touch up of air-drying primer compatible with factory applied primer, and as follows:
    - .1 Clean exposed surfaces with soap and water to remove foreign matter before site touch-up.
    - .2 Finish exposed site welds to a smooth uniform surface and touch-up with site applied rust inhibitive primer.
    - .3 Site apply touch-up primer on exposed surfaces where zinc coating or factory applied primer has been damaged during installation or handling.

**END OF SECTION**

1 General

**1.1 SUMMARY**

- .1 Furnish labour, materials and other services to complete the fabrication and installation of:
  - .1 Glazed aluminum interior storefront glazing and window framing.
  - .2 Interior manual swing glazed aluminum doors.

**1.2 RELATED REQUIREMENTS**

- .1 Section 07 84 00: Firestopping and Smoke seals
- .2 Section 07 92 00: Sealants
- .3 Section 08 80 00: Glazing
- .4 Section 09 21 16: Gypsum Wallboard
- .5 Section 09 90 00: Painting

**1.3 REFERENCE STANDARDS**

- .1 Aluminum Association (AA):
  - .1 Aluminum Design Manual, Latest Edition
- .2 American Architectural Manufacturers Association (AAMA):
  - .1 AAMA 611-12, Voluntary Specification for Architectural Anodized Aluminum
  - .2 AAMA 1503-09, Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections
  - .3 AAMA 2603-13, Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels
  - .4 AAMA 2604-13, Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coating on Aluminum Extrusions and Panels
  - .5 AAMA 2605-13, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performance Organic Coating on Aluminum Extrusions and Panels
  - .6 SFM-1-87, Aluminum Storefront and Entrance Manual
- .3 American National Standards Institute (ANSI):
  - .1 ANSI H35.1-2006, Alloy and Temper Designation Systems for Aluminum
  - .2 ANSI/BHMA A156.1-2013, Butts and Hinges
  - .3 ANSI/BHMA A156.3-2001, Exit Devices
  - .4 ANSI/BHMA A156.4-2013, Door Controls - Closers
  - .5 ANSI/BHMA A156.5-2010, Cylinders and Input Devices for Locks
  - .6 ANSI/BHMA A156.6-2010, Architectural Door Trim
  - .7 ANSI/BHMA A156.8-2010, Door Controls - Overhead Stops and Holders
  - .8 ANSI/BHMA A156.16-2002, Auxiliary Hardware
  - .9 ANSI/BHMA A156.21-2009, Thresholds
- .4 American Society for Testing and Materials (ASTM):
  - .1 ASTM A653/A653M-06, Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process.

- .2 ASTM A167-99 (R2004), Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
- .3 ASTM B209/209M-04, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
- .4 ASTM B221/B221M-05, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
- .5 ASTM B308/B308M-02, Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles
- .6 ASTM B429-02, Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube
- .5 Canadian Standards Association (CSA):
  - .1 CAN/CSA G40.20/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels
  - .2 CSA W47.1-09, Certification of Companies for Fusion Welding of Steel Structures
  - .3 CSA W47.2-11, Certification of Companies for Fusion Welding of Aluminum.
  - .4 CSA W59-03(2008), Welded Steel Construction (Metal Arc Welding), Metric.
  - .5 CSA W59.2-M1991(R2013), Welded Aluminum Construction
- .6 Canadian Welding Bureau (CWB Group Industry Services):
  - .1 CWB 112E, 93-1, Welding Symbols Study Guide
  - .2 CWB 113E, 94-1, Weld Quality and Examination Methods Study Guide
- .7 The Society for Protective Coatings (SSPC)/National Association of Corrosion Engineers (NACE International):
  - .1 Surface Preparation Guidelines:
    - .1 SSPC-SP COM Surface Preparation Commentary for Steel and Concrete Substrates
    - .2 SSPC-PS Guide 12.00, Guide to Zinc-Rich Coating Systems

#### **1.4 WORK SUPPLIED BUT INSTALLED BY OTHER SECTIONS**

- .1 Supply inserts, anchors and other items to be built into work of other sections and required for support of aluminum framed entrances and storefronts.
- .2 Provide clear instructions and, if required setting templates to ensure accurate setting of components.

#### **1.5 QUALITY ASSURANCE**

- .1 System Manufacturer's Qualifications:
  - .1 Minimum five (5) years continuous Canadian experience in successful production of work of type and quality specified. Submit proof of experience upon Consultant's request.
- .2 Erector's Qualifications:
  - .1 Manufacturer's forces or forces licensed by manufacturer. Work of this section shall be performed by workers trained and experienced in the type of work specified. A manufacturer's representative shall be at the site during erection of system to direct the various stages of operations.

## 1.6 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-Construction Meeting: Conduct a pre-construction meeting in accordance with Section 01 31 19 Project Meetings, on site to review methods and procedures related to aluminum framed entrances and storefronts including, but not limited to, the following:
  - .1 Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - .2 Review location and alignment of vertical and horizontal elements as they relate to the aesthetic criteria indicated on the Drawings, and the technical requirements indicated on the shop drawings.

## 1.7 SUBMITTALS

- .1 Submit submittals in accordance with the General Conditions and Section 01 33 00.
- .2 Shop Drawings:
  - .1 Furnish complete shop and erection drawings required for the work of this section to the Consultant for review prior to fabrication. Shop drawings shall bear the seal and signature of a Professional Engineer registered to practise at the Place of Work.
  - .2 Co-ordinate shop drawings for work of this section with those for other trades to ensure correct interface details required to provide watertight installation.
  - .3 Shop drawings shall incorporate plans, elevations, sections and details for all work in this Section. The details shall show and specify all metal and glass thicknesses, types and finishes; areas to be sealed and sealant materials; gaskets; glazing methods; direction and magnitude of thermal expansion; type of construction including joinery, fasteners and welds; all anchorage assemblies and components; connections, fastenings, shapes and finishes; the fabrication and erection tolerances for the work in this section and the adjoining related work of other sections.
- .3 Product Data:
  - .1 Product Data: Submit product data including construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of product indicated.
- .4 Test Data:
  - .1 If requested by Consultant, submit test data from a recognized independent testing agency, acceptable to Consultant, verifying that specified requirements are being met. Test results may be from a previous testing program conducted on a system similar to that specified herein.
- .5 Samples:
  - .1 Submit duplicate minimum 2" x 4" samples of each type of aluminum finish specified. Upon Consultant's request, furnish samples of glass types, gaskets, tapes and sealants.
- .6 Safety Data Sheets:
  - .1 Submit WHMIS safety data sheets for inclusion with project record documents. Keep one copy of WHMIS safety data sheets on site for reference by workers.
- .7 Maintenance and Glazing Instructions:
  - .1 On completion of work of this section, supply maintenance and glazing instructions for insertion into the Operating and Maintenance Manual.

## 1.8 STORAGE, DELIVERY, HANDLING AND PROTECTION

- .1 Co-ordinate deliveries to comply with construction schedule and arrange ahead for off the ground, under cover storage location.

- .2 Assembled units and their component parts shall be transported, handled and stored in a manner to preclude damage of any nature.
- .3 Ship and store pre-glazed units in upright position only or use method which will positively prevent extrusion of sealants and shifting of glass within framing.
- .4 Accessory materials required for erection at the site shall be delivered to the site in manufacturer's labelled containers.
- .5 Remove all units or components which are cracked, bent, chipped, scratched or otherwise unsuitable for installation and replace with new.

### 1.9 SITE CONDITIONS

- .1 Provide safe and adequate equipment on the site to execute the work of this section, including scaffolding, staging, hoisting, safety protection equipment, tools, plant and other equipment required for the completion of the work of this section.
- .2 Site Measurements: Verify actual locations of structural supports for aluminum framed entrance and storefront systems by site measurements before fabrication and indicate measurements on Shop Drawings.
- .3 Established Dimensions: Establish dimensions and proceed with fabricating aluminum framed entrance and storefront systems where site measurements cannot be made without delaying the Work; coordinate construction to ensure that actual dimensions correspond to established dimensions.

### 1.10 WARRANTY

- .1 Warrant work of this section against any defects in materials and workmanship in accordance with the General Conditions but for an extended period of ten (10) years and agree to promptly and without cost to Owner make good defects which become evident during warranty period. Without restricting the generality of the warranty, defects shall include leaking, deformation of members, breaking of glass due to thermal or structural movement, discolouration of finishes and failure of sealants.
- .2 Warrant insulating glass units in accordance with General Conditions for a period of five (5) years. Warrant that units will be free from material obstruction of vision as a result of dust or film formation on internal glass surfaces by any cause other than extrinsic glass breakage.
- .3 Warrant that any unit failing shall be removed and replaced without cost to the Owner.

## 2 Products

### 2.1 MANUFACTURERS

- .1 Basis-of-Design products are named in this Section; additional manufacturers offering similar aluminum framed entrance and storefront systems may be incorporated into the work provided they meet the performance requirements established by the named products.
- .2 Acceptable Materials Manufacturers: Subject to compliance with requirements specified in this Section and as established by the Basis-of-Design Materials, manufacturers offering products that may be incorporated into the Work include; but are not limited to, the following:
  - .1 Alumicor Limited
  - .2 Oldcastle Building Envelope
  - .3 Kawneer Canada Ltd

### 2.2 MATERIALS

- .1 Aluminum:
  - .1 Extrusions: AA6063-T5 alloy, anodizing quality, conforming to ASTM B221-92a.



- .2 Plate and Sheet: AA1100-H14 alloy, anodizing quality unless otherwise indicated minimum 0.125" thick, conforming to ASTM B209-92a.
- .3 Thresholds and Sills: AA6061-T6 alloy, anodizing quality, conforming to ASTM B221-92a.
- .4 Exposed surfaces of aluminum shall be free of die marks, scratches, blisters, "leave-off" marks, or other blemishes, whether left unfinished or finished.
- .5 Aluminum Welding Materials: Conforms to CSA W59.2.
- .2 Galvanized Steel Sheet:
  - .1 Commercial grade, stretcher levelled or temper rolled conforming to ASTM A525-91b with galvanized zinc G90 (Z275) coating conforming to ASTM A526/A526M-90.
- .3 Glazing Materials: As indicated in Section 08 80 00 Glazing.
- .4 Sealant Materials:
  - .1 Perimeter Sealant: Multi-component, chemical curing epoxidized polyurethane type sealant conforming to ASTM C920, 'Dymeric 240' by Tremco (Canada) Ltd., or CWS/CCS by Dow Corning, or approved equal. Colour as selected later by Consultant.
  - .2 Backer Rod: Round open cell foam, extruded polyethylene, Shore A hardness of 20, tensile strength 140 to 200 kPa, oversized 30-50%, compatible with sealant and primer, non-adhering to sealant, 'Ethafoam SB' by Dow Chemical Canada Inc., or 'Sof Rod' by Tremco (Canada) Ltd., or approved equal.
  - .3 Joint Primers: As recommended by sealant manufacturer.
  - .4 Solvents, Cleaning Agents and Other Accessory Materials: As recommended by sealant manufacturer in writing.
  - .5 Bond Breakers: Where required, shall be polyethylene tape (or equal) as recommended by manufacturer of sealant in writing.
- .5 Zinc Rich Paint:
  - .1 Ready mixed, zinc rich primer conforming to CAN/CGSB-1.181, 'Sealtight Galvafruid Zinc-Rich Coating' by W.R. Meadows of Canada Limited, or 'Zinc Clad No.7 Organic Zinc Rich Primer' by Sherwin Williams Company of Canada Ltd.
- .6 Bituminous Paint: Conforming to CAN/CGSB-1.108, Type 2.
- .7 Fasteners: "400" Series stainless steel, or "300" Series stainless steel.
- .8 Firestopping: Non-combustible, semi rigid, compressible, mineral wool insulation, with "Z" shaped galvanized sheet steel impale clips, ULC listed for required fire resistance rating, 'Fire-Bloc' by M.W. McGill and Associates Limited, or 'Fire Barrier' by A/D Fire Protection Systems Inc., or 'Paroc Safing Insulation' by Partek Insulations Ltd.

## 2.3 ENTRANCE DOORS

- .1 Manufacturer's extruded aluminum glazed doors for manual swing operation, reinforced as required to withstand traffic conditions.
- .2 Interior Door Type 1:
  - .1 Construction: Medium stile, non-thermally broken frame sections.
  - .2 Glazing Method: Square stops for single glazed doors, with non-removable glazing stops on outside of door.
  - .3 Basis-of-Design Material: Alumicor Canadian Series Door 400A, or Kawneer 350 Medium Stile Entrances.

## 2.4 STOREFRONT FRAMES

- .1 Manufacturer's standard extruded aluminum framing members of thickness required and reinforced as required to support imposed loads.
- .2 Interior Frame Type 1:
  - .1 Construction: Non-thermally broken.
  - .2 Dimensions: Nominal 1-3/4" face x 4-1/2" deep back frame profile with glazing throat to accommodate 1/4" glazing unit.
  - .3 Glazing Method: Flush glazed.
  - .4 Operable Units: None.
  - .5 Basis-of-Design Material: Alumicor FlushGlaze 800 Series or Kawneer Trifab 400.

## 2.5 DOOR HARDWARE

- .1 Manufacturer's heavy duty hardware units in sizes and types as required to meet entrance use as indicated on Drawings, with the following opening force limitations:
  - .1 Pushes: 'Style "Classic CP-II" Push' with clear anodized finish by Kawneer Company of Canada Limited, or approved equal.
  - .2 Pulls: 'Style "Classic CO-9" Pull' with clear anodized finish by Kawneer Company of Canada Limited, or approved equal.
  - .3 Accessible Interior Doors: Maximum 20 N to operate door through entire range of movement.
  - .4 Latches and Exit Devices: Not more than 70 N required to release latch.
- .2 Provide door hardware in accordance with the requirements of this Section; using products that are recommended and supplied by entrance system manufacturer; in accordance with referenced standards, meeting requirements for description, quality, type, and function listed in hardware schedule.
- .3 Hinges:
  - .1 Pivot Hinges: In accordance with BHMA A156.4, Grade 1, with 3 offset pivots located at top, intermediate and bottom of each door leaf.
  - .2 Ball Bearing Butts: In accordance with BHMA A156.1, Grade 1, radius corner; manufactured with non-removable pins from nonferrous metal, with 4 hinges for each door leaf.
    - .1 Continuous Geared Hinges: Roton continuous geared hinges incorporating lubricated bearings between the knuckles, #780-112HD by Kawneer.

**SPEC NOTE: Deadbolt provides sufficient security for doors that open once in the morning and close at night operations; typical uses are for warehouses. Dead latches provide similar security as deadbolts, but allow for personnel to exit the locked door by use of thumb turn or paddle to retract the latch, latch is fully retracted by key for normal operation; typical uses are for offices or buildings where multiple tenants exit locked premises after close of business. Deadbolt/Latch is a high security lock typically used for banks or retail establishments with staff exiting requirements.**

- .4 Locking Devices: Manufacturer's standard locking mechanism that do not require use of key, tool, or special knowledge for operation, and as follows:
  - .1 Mortise Auxiliary Locks: Lock body manufactured in accordance with BHMA A156.5, Grade 1, fabricated from corrosion resistant steel to fit into door stile specified and as follows:
    - .1 Bolt Action: Deadbolt/Latch.
      - .1 Deadbolt: Maximum security deadbolts with cam and mortise with strike trim, 1850 Series by Adams-Rite Manufacturing Co. Locks shall be in

one leaf of each pair of doors. Double doors shall be key operated on exterior side and thumb turn on the interior side (one leaf of each pair). Face of rails not having cylinders, shall not be drilled.

- .2 Function: Single Action Bolting, locked for security and unlocked for two way traffic.
- .3 Faceplate Shape: To match profile of leading entrance stile.
- .4 Finish: To match adjacent entrance stiles.
- .5 Door Operation: Single swinging door operation.
- .2 Trims:
  - .1 Strikes: Provide strike with black plastic dust box for each latch or lock bolt; fabricated for aluminum framing.
  - .2 Closers: In accordance with BHMA A156.4, Grade 1, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to meet site conditions and requirements for opening force; having accessories required for complete installation.
    - .1 Heavy-duty, concealed mounted, top jamb overhead type with hold-open feature, conforming to CAN/CGSB-69.20-M, 2030 Series by LCN Closers, or approved equal by Norton Door Controls.
  - .3 Concealed Overhead Holders: In accordance with BHMA A156.8, Grade 1.
  - .4 Surface Mounted Holders: In accordance with BHMA A156.16, Grade 1.
  - .5 Door Stops: In accordance with BHMA A156.16, Grade 1, floor or wall mounted as appropriate for door location indicated with integral rubber bumper.
    - .1 GJ-100 Series by Glynn-Johnson, to suit condition.
  - .6 Silencers: In accordance with BHMA A156.16, Grade 1.

## 2.6 FABRICATION

- .1 Aluminum components shall be extruded sections and shapes, unless otherwise specified or shown.
- .2 Components required, for which extruded sections are not available shall be accurately formed to profiles indicated. Use minimum 14 gauge sheet aluminum unless otherwise indicated.
- .3 All fastenings and connections shall be concealed unless approved by Consultant.
- .4 Joints between horizontal and vertical mullions shall be accurately cut and fitted. Horizontal and vertical mullions shall be in true plane with interior and exterior faces in line.
- .5 Mechanically joined sections shall have hairline joints.
- .6 Reinforce members as required to withstand loads and to maintain deflection within allowable limits.
- .7 Internally reinforce framing members where work of other trades is to be fastened thereto.
- .8 Install air cut-offs in continuous vertical members to prevent stack effect of enclosed air columns.
- .9 Framing members shall have internally formed keyed slots to receive and retain preformed gaskets, seals and thermal separators.
- .10 Pressure plates shall be designed with integrally formed keyed slots to receive seals and of thickness necessary to provide permanent, uniform, sealing pressures for glazing units, without deformation.
- .11 Fabricate system to accommodate and interface with work of other sections by means of rabbets, interlocks, miscellaneous angles, trim and filler sections as required.

- .12 Prepare aluminum storefront framing and aluminum doors for installation of finish door hardware including but not limited to; deadlocks and other door finish hardware as specified in Section 08 70 00 and the Hardware Schedule.
- .13 Do not expose welds. Burn, discolour, distortion, impairment, deterioration or delamination of finish surfaces will be rejected.
- .14 Form covers, closures, mouldings and trim integral with or immediately adjacent to work of this Section to profiles indicated, of minimum 14 gauge sheet aluminum.
- .15 Fabricate extruded or formed aluminum sills to profiles indicated to suit wall conditions and minimum 3/32" thick. Provide drip deflectors at sill ends and at abutting vertical surfaces. Open ends of sills shall be fitted with neatly applied closure plates. Anchors shall be designed not to work loose after installation. Unless otherwise detailed, provide "flush" slip joint at intermediate sill joints.

## 2.7 FINISHES

- .1 Clear Anodizing (Class II):
  - .1 All aluminum entrance and storefront framing exposed in the finished work shall have integral clear anodic coating, minimum 0.4 mils thickness, and conforms to Aluminum Finish Designation AA-M12C22A31, Architectural Class II.
- .2 Steel (Concealed):
  - .1 Hot-dip galvanized, or zinc rich paint.
- .3 Isolate where necessary to prevent electrolysis due to dissimilar metal-to-metal contact or metal-to-masonry and concrete contact. Use bituminous paint, butyl tape or other approved divorcing material.

## 3 Execution

### 3.1 EXAMINATION

- .1 Check structural elements and adjoining work of other sections on which work of this section is dependent, verify governing dimensions, floor elevations, floor to floor heights, minimum clearances between framing system and structure. Confirm that conditions are satisfactory before proceeding. Commencement of work of this section indicates acceptance of surfaces and conditions.

### 3.2 INSTALLATION

- .1 General:
  - .1 Erect storefront framing curtain wall systems plumb, level and square, in correct relation to work of other sections, within a maximum non-cumulative deviation of 1/8" per 12'-0" length of member, and with members accurately fitted and aligned at joints and intersections.
  - .2 Anchor system to building structure, adjusting as required to meet erection tolerances and secure to prevent movement other than that which is expected due to structural deflection and creep and thermal expansion and contraction.
  - .3 Provide all devices and components required for erection of system.
  - .4 Use concealed fastenings only.
  - .5 Touch up steel anchoring components, after installation, with zinc rich paint.
  - .6 Provide aluminum flashings, fillers, covers and sealants indicated and as required to render system weather tight and to meet specified performance criteria. Ensure effective seal at laps, end joints and changes of direction.

- .7 Provide aluminum sills, complete with chairs, anchors, expansion plates, drip deflectors as detailed at windows. Provide sills in longest practicable lengths. Provide flush slip joints at maximum 10'-0" O.C.
- .8 Provide continuity of thermal and air seal/vapour barriers with adjacent thermal and air seal/vapour barrier systems. Pack spaces between frames and adjacent building elements and where shown with fibrous insulation.
- .9 Seal joints between storefront framing system and adjacent building elements, and between frames, sills and other materials. Caulk inside and outside, with sealant as specified herein.
- .10 Install all door hardware on doors. Test all doors on completion of installation and adjust as required for smooth and efficient operation.
- .11 Completed installation shall be of adequate strength to support operating entrance doors, and wind loading as specified without glass shaking or vibrating when entrance doors are in use.
- .12 Leave final installation water and weathertight.
- .2 Glazing:
  - .1 Install glass types as indicated in Section 08 80 00.
  - .2 Size glass units to accurately fit openings with appropriate clearance all around.
  - .3 Identify glazed openings, mark each light of glass. Indicate presence of glass.
  - .4 Replace all damaged or broken glass at no expense to Owner, prior to completion of work. Remove all broken glass from premises.
  - .5 Locate and install setting blocks and spacers according to glass manufacturer's directions. Centre and space each piece of glass on premoulded neoprene rubber spacers. Provide minimum of two spacers on each edge of each piece of glass and four where dimension exceeds 4'-0". Use spacers of size to accurately fit each thickness of glass.
  - .6 Clean glass and metal surfaces to present clean, dry, grease and oil free surfaces to receive glazing tapes, gaskets or seals.
  - .7 Glazing to be undertaken at temperatures recommended by manufacturer of glazing materials.
  - .8 Provide sealed double glazed units at all locations.
- .3 Sealants:
  - .1 Apply sealants in strict conformance with manufacturer's written directions.
  - .2 Gun apply 3 continuous beads of threshold sealant under extruded aluminum thresholds. Bead diameter shall be sufficient to ensure full width seal. Remove excess sealant by approved methods.
  - .3 Apply sealant under pressure with hand or power actuated gun or other appropriate means. Gun shall have nozzle of proper size and provide sufficient pressure to completely fill joints as designed. All joint surfaces shall be tooled to provide the contour as indicated on drawings. For application of sealant when air temperature is below 40 deg F (4 deg C) consult sealant manufacturer for recommendations.
  - .4 Thoroughly clean all joints, removing all foreign matter such as dust, oil, grease, water, surface dirt, frost and old caulking materials. Sealant must be applied to the base surface. Previously applied paint or primer must be entirely removed.
  - .5 Non-porous surfaces shall be cleaned either mechanically or chemically. Protective coating on metallic surfaces shall be removed by a solvent that leaves no residue. Solvent shall be used with clean cloths or with lintless paper towels. Do not allow solvent to air dry without wiping. Wipe dry with clean, dry cloth or lintless paper towels.

- .6 All joints to receive sealant shall be as indicated on shop drawings. Do not seal joints until they are in compliance with drawings, or meet with the approval of the Consultant.
- .7 Joints to receive sealant shall be a minimum of 1/4" wide by 1/4" deep, unless otherwise approved.
- .8 For joints in metal, glass and other non-porous surfaces, sealant depth shall be a minimum of half the applied sealant width, and shall in no case exceed the applied sealant width.
- .9 Install backer rod or joint filler, of type and size specified, at proper depth in joint to provide sealant dimensions as detailed. Backer rod shall be of suitable size and shape, compressed 25-50% to fit joints as required. Sealant shall not be applied without back-up material and/or bond breaker strip. When using backer rod stock, avoid lengthwise stretching and do not twist or braid it.
- .10 Apply masking tape, where required, in continuous strip in alignment with joint edge.
- .11 Prime surfaces where required with primer as recommended by sealant manufacturer.
- .12 Sealants applied both in factory and at the job site shall be used in strict accordance with specific recommendations supplied by sealant manufacturer.
- .13 All hidden joints, or joints to be concealed by metal covers, shall be cleaned, sealed and tooled, inspected and approved prior to replacing metal covers.
- .14 Apply, tool and finish sealant as required. When tooling sealants, use tooling solution recommended by sealant manufacturer. Remove masking tape immediately after joints have been tooled.
- .15 Clean adjacent surfaces free of sealant as work progresses. Use solvent or cleaning agent as recommended by sealant manufacturer. All finished work shall be left in a neat clean condition.

### 3.3 FINAL CLEANING

- .1 At completion of work of this section, remove all labels from glass and clean inner and outer faces of glass and all exposed metal surfaces at interior and exterior. Remove all protective metal coatings, stains and foreign matter, and leave in uniform colour and in first-class condition, to Consultant's satisfaction.
- .2 Replace scratched or broken glass and make good any damaged materials, all in accordance with Section 01 77 19.

**END OF SECTION**

1 General

**1.1 SUMMARY**

- .1 This Section includes requirements for the supply and installation of interior all glass entrance and panels.

**1.2 RELATED REQUIREMENTS**

- .1 Section 07 92 00: Sealants  
.2 Section 08 71 00: Hardware  
.3 Section 08 80 00: Glazing  
.4 Section 09 21 16: Gypsum Wallboard

**1.3 DEFINITIONS**

- .1 Equal Dimensions: Entrance system assemblies indicating equal dimensions on the Drawings shall be calculated to align with in-place structural elements followed by even division of the space between structural elements. This shall mean that entrance system materials are evenly spaced between adjacent structural members, not necessarily evenly spaced across the entire wall assembly.

**1.4 REFERENCE STANDARDS**

- .1 American Architectural Manufacturer's Association ([AAMA](#)):  
.1 AAMA 611-98, Voluntary Specification for Architectural Anodized Aluminum  
.2 American National Standards Institute ([ANSI](#)):  
.1 BHMA A156.4-2008, Door Closers  
.3 American Society for Testing and Materials ([ASTM](#)):  
.1 ASTM A666-03, Standard Specification for Annealed or Cold Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar  
.2 ASTM B36/B36M-08a, Standard Specification for Brass Plate, Sheet, Strip and Rolled Bar  
.3 ASTM B209/209M-07, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate  
.4 ASTM B221/B221M-08, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes  
.5 ASTM B429-06, Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube  
.4 Canadian General Standards Board (CGSB):  
.1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass

**1.5 SUBMITTALS**

- .1 Provide required information in accordance with Section 01 33 00 – Submittal Procedures,  
.2 Action Submittals: Provide the following submittals before starting any work of this Section:  
.1 Product Data: Submit product data including construction details, material descriptions, dimensions of individual components and profiles, and finishes.  
.2 Shop Drawings: Submit shop drawings indicating fabrication and installation details including, but not limited to, the following:  
.1 Plans, elevations, and sections

- .2 Details of fittings and glazing
- .3 Hardware quantities, locations, and installation requirements
- .3 Samples: Submit samples for each type of exposed finish specified for verification by the Consultant as follows:
  - .1 Metal Finishes: 150 mm long sections of patch fittings, rails, and other items.
  - .2 Glass: 150 mm square panels indicating exposed edge finish.

#### 1.6 SITE CONDITIONS

- .1 Site Measurements: Verify actual locations of structural supports for all glass entrances and panel systems by site measurements before fabrication and indicate measurements on Shop Drawings.
- .2 Established Dimensions: Establish dimensions and proceed with fabricating all glass entrances and panel systems where site measurements cannot be made without delaying the Work; coordinate construction to ensure that actual dimensions correspond to established dimensions.

#### 1.7 WARRANTY

- .1 Manufacturer's Warranty: Provide manufacturer's standard form of warranty covering repair or replacement components of all glass systems that fail in materials or workmanship within a period of two (2) years from date of Substantial Performance; failure of performance requirements will be considered to include; but not be limited to, the following:
  - .1 Deflection exceeding specified limits
  - .2 Thermal stresses transferred to building structure
  - .3 Glazing-to-glazing contact in structural silicone glazed systems
  - .4 Loosening or weakening of fasteners, attachments, and other components.
  - .5 Sealant failure
  - .6 Failure of operating units to function properly

### 2 Products

#### 2.1 MANUFACTURERS

- .1 Basis-of-Design Products: Products named in this Section were used as the basis-of-design for the project; additional manufacturers offering similar products may be incorporated into the work of this Section provided they meet the performance requirements established by the named products and provided they submit requests for substitution a minimum of five (5) days in advance of Bid Closing.
- .2 Acceptable Materials Manufacturers: Subject to compliance with requirements specified in this Section and as established by the Basis-of-Design Materials, manufacturers offering products that may be incorporated into the Work include; but are not limited to, the following:
  - .1 Dorma Door Controls Inc., DormaGlas

#### 2.2 MATERIALS

- .1 Tempered Glass: In accordance with CAN/CGSB-12.1 and as follows:
  - .1 Thickness: 13.5 mm
  - .2 Type: 2 - Tempered.
  - .3 Class: B - Float Glass.
  - .4 Colour: Clear
  - .5 Category: II - 540 J impact resistance.



- .6 Edges:
  - .1 Exposed Edges: Flat polished.
  - .2 Butt Edges: Flat ground.
- .2 Aluminum: Materials recommended by manufacturer for type of use and finish indicated, and as follows:
  - .1 Sheet and Plate: In accordance with ASTM B209/B209M, and ANSI H35.1 AA1100-H14, or AA5005-H32 or H34, anodizing quality.
  - .2 Extruded Bars, Rods, Profiles, and Tubes: In accordance with ASTM B221/B221M, and ANSI H35.1 AA6063-T5 or T6, anodizing quality.
  - .3 Extruded Structural Pipe and Tubes: In accordance with ASTM B429, and ANSI H35.1 AA6061-T6 or AA6063-T6, anodizing quality.
  - .4 Structural Profiles: In accordance with ASTM B308/B308M, anodizing quality.
  - .5 Welding Rods and Bare Electrodes: CSA W59.2.
- .3 Stainless Steel Cladding: In accordance with ASTM A 666, Type 302 or 304 as standard with manufacturer; #4 directional satin finish.

### 2.3 SLIDING DOOR ASSEMBLIES

- .1 Accessibility Standard: Comply with applicable provisions in ADA-ABA Accessibility Guidelines for Buildings and Facilities
- .2 Sliding Door Track: Full-width extruded aluminum track with end caps, 2-3/4 inch (69mm) high, designed for operation, size, and weight of glass panel door, with factory-finished track with concealed clamping roller carriers, integrated end-of-travel stops, and floor guide recessed into counter top.
  - .1 Ceiling surface-mounted.
  - .2 Partition side-mounted.
  - .3 Partition opening top-jamb-mounted.
- .3 Door Panel Carriers: Concealed trolley system designed for operation, size, and weight of glass panel door, with ball-bearing wheels, and with clamp-on attachment to glass panels requiring no glass penetration.
- .4 Finish: Anodic Finish: AAMA 611-12, Class II, 0.010 mm or thicker. Color: [Clear] [Match No. 4 satin brushed stainless steel].

### 2.4 MANUAL SLIDING DOORS:

- .1 Paired sliding doors with cushioned close.
  - .1 Basis of Design: dormakaba MUTO 150 DORMOTION.
  - .2 Sidelights: Captured by U channels integrated with door top track assembly. Bottom of sidelites held within [dry gasket glazing channel] [glazing U channels] [glazing clamps] as indicated on Drawings.

### 2.5 FITTINGS

- .1 Patch Fittings: Stainless steel clad aluminum.
- .2 Rails:
  - .1 Material: Stainless steel clad aluminum.
  - .2 Height: Nominal 100 mm
  - .3 Style: Tapered top

- .3 Accessory Fittings: Match patch fitting and rail metal and finish for the following:
  - .1 Overhead doorstop.
- .4 Anchors and Fastenings: Concealed.
- .5 Weather Stripping: Sweep type.

## 2.6 HARDWARE

- .1 Heavy duty hardware units in sizes, quantities, and types recommended by manufacturer of all glass entrances systems; match fitting metal and finish for exposed parts.
- .2 Pulls and Handles: One-sided
  - .1 Design: [Specifier insert design] [As indicated on Drawings] [As selected by Architect from manufacturer's standard designs].
- .3 Mechanical Locks and Latches:
  - .1 Sliding Active-Leaf Locksets with twist key lock fitted to bottom track: Manufacturer's standard patch dead-bolt locksets.

## 2.7 ACCESSORY MATERIALS

- .1 Bituminous paint: Isolation coating, acid and alkali resistant asphaltic paint in accordance with MPI Architectural Painting Specification Manual "Approved Product" listing MPI#35.
- .2 Structural sealant: Clear structural glazing, shore A hardness 15-25, conforming to CAN/CGSB-19.13-M, Classification C-1-40-B-N and C-1-25-B-N, and ASTM C920, Type S, Grade P, Class 25, use T, M.
  - .1 Acceptable material:
    - .1 Chemtron Multiseal
    - .2 Tremco Spectrum 2 or Proglaze II

## 2.8 FABRICATION

- .1 Provide holes and cut outs in glass to receive hardware, fittings, rails, and accessories before tempering glass; do not cut, drill, or make other alterations to glass after tempering:
  - .1 Fully temper glass using horizontal process and fabricate with roll wave distortion parallel with bottom edge of door or lite when installed.
  - .2 Factory assemble components and factory install hardware to greatest extent possible.

## 2.9 ALUMINUM FINISHES

- .1 Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- .2 Clear Anodized Finish:
  - .1 Class II Finish: Architectural Class II, clear coating 0.010 mm or thicker in accordance with AAMA 611.

## 3 Execution

### 3.1 EXAMINATION

- .1 Examine areas and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- .2 Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- .1 Install all glass systems and associated components in accordance with manufacturer's written instructions.

- .2 Set units level and plumb.
- .3 Maintain uniform clearances between adjacent components.
- .4 Maximum 13 mm sealant space between structural sealant glazed system and adjacent construction.
- .5 Install structural sealant glazing system in accordance with manufacturer's instructions.
- .6 Lubricate hardware and other moving parts in accordance with manufacturer's written instructions.
- .7 Set, seal, and grout floor closer cases as required to suit hardware and substrate indicated.

### **3.3 ADJUSTING AND CLEANING**

- .1 Adjust doors and hardware to produce smooth operation and tight fit at contact points and weather stripping.
- .2 Remove excess sealant and glazing compounds and dirt from surfaces.
- .3 Wash glass on both faces not more than four (4) days prior to declaration of Substantial Performance for the project.

**END OF SECTION**

1 General

**1.1 SUMMARY**

- .1 Supply and install door hardware listed in the Door Hardware Schedule, prepared by an Architectural Hardware Consultant, establishes the quality standards, finishes, manufacturers and functions.

**1.2 RELATED REQUIREMENTS**

- .1 Section 08 11 13: Steel Doors and Frames.
- .2 Section 08 41 13: Aluminum Framed Entrances and Storefronts

**1.3 ADMINISTRATIVE REQUIREMENTS**

- .1 Submission of Substitutions: Materials other than the named products for the Project may be acceptable to the Consultant. Submit manufacturer's names and complete catalogue number of alternative hardware types proposed for supply and submit this list for review before preparing shop drawings.
- .2 Consultant will review all proposed alternates prior to close of bids when submitted no later than five (5) days prior to bid closing date
- .3 Substitutions for materials of this section will be considered after the close of bids.
- .4 Pre-installation Conference: Arrange a preconstruction meeting in accordance with Section 01 31 19 - Project Meetings to discuss the following:
  - .1 Keying Conference: Conduct keying conference at Project site and incorporate decisions into final keying schedule after reviewing door hardware keying system.
  - .2 Electrified Hardware Conference: Conduct pre-installation conference at Project site and review methods and procedures related to electrified door hardware.
- .5 Coordination: Obtain and distribute templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Coordinate with shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware.

**1.4 SUBMITTALS**

- .1 Provide submittals specified and as required to assess conformance with the Contract Documents, in accordance with the General Conditions and Section 01 33 00.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
  - .1 Product Data: Submit product data indicating installation details, material descriptions, dimensions of individual components and profiles, and finishes.
  - .2 Shop Drawings: Submit shop drawings indicating details of electrified door hardware including, but not limited to, the following:
    - .1 Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer installed and site installed wiring.
  - .3 Samples:
    - .1 Submit samples of complete line of hardware and finishes, if and when requested, to accompany any proposal for substitution. Fully label each sample as to manufacture, type, size and location for use proposed.
- .3 Do not order hardware from manufacturers until samples have been approved. Hardware and finishes supplied shall be identical with approved samples.

**1.5 PROJECT CLOSEOUT SUBMISSION**

- .1 Operation and Maintenance Data: Provide operations and maintenance information in accordance with Section 01 33 00.

- .2 Spare Parts and Tools: Submit unique parts and tools for maintaining hardware system in accordance with Section 01 33 00.

## 1.6 DELIVERY, HANDLING AND PROTECTION

- .1 Pack hardware in suitable wrappings and containers to protect from injury during shipping and storage. Enclose accessories, fastening devices and other loose items with each item. Mark packages for easy identification as indicated on approved delivery schedule. Hand over hardware to designated installer.

## 1.7 WARRANTY

- .1 Warrant door closers to remain free from defects in materials and workmanship in accordance with the General Conditions, but for a period of five (5) years, and locks and locksets for two (2) years. Agree to promptly make good defects which become apparent within warranty periods without cost to Owner.

## 2 Products

### 2.1 GENERAL

- .1 Supply to the job site all items of finishing hardware as indicated in the Hardware Scheduled appended to this Section. All items to be supplied with complete and adequate fixing and anchoring devices necessary for satisfactory installation into or upon the various surfaces to which it is to be affixed.
- .2 Cooperate with all trades using hardware supplied under this Section.
- .3 Render a complete service to the metal fabrication contractor wherein full cooperation is assured them of the supply of hardware information, and templates as requested.
- .4 Supply for installation by others where specified, as scheduled or indicated on the drawings.
- .5 In case of dispute the Consultant's decision will be binding in all cases.
- .6 Provide six, (6) copies of the hardware specification for field construction and office use.
- .7 All hardware shall be of the best quality and design, construction and finish, free from all defects.
- .8 All blank strikes shall be ASA with no lip.
- .9 Lock strikes shall be ASA with lip.
- .10 All deadlock strikes shall be ASA with no lip.
- .11 Where door pulls are scheduled on one side of door and a push plate on the other side, the contractor shall be responsible for fixing, so that the pull shall be secured through the door from the reverse side and the push plate installed to cover the thru bolts which will be countersunk flush with door.
- .12 All door closers shall be non sized and where possible non handed. They shall be sized and adjusted by the installer to suit the site conditions.
- .13 Panic sets are to be of style specified and completely plated.
- .14 Before installing any hardware, carefully check all architectural drawings of Work requiring hardware, verify door swings, door and frame material and operating conditions. Ensure hardware will fit Work.
- .15 Provide ULC approved hardware to ULC labelled doors.
- .16 Check shop drawings and frame and door lists affecting hardware type and installation. Certify to correctness or advise Consultant in writing of required revisions.
- .17 Templates:
  - .1 Check hardware schedule, drawings and specifications. Furnish promptly to applicable trades any patterns, templates, template information and manufacturer's literature

- required for proper preparation for and application of hardware, in ample time to facilitate progress of Work.
- .2 Exposed screws for installing hardware shall have Phillips or Robertson heads.
  - .3 All door closers shall have back-checking features and shall be of proper size to operate door efficiently.
  - .4 Use no wall stops on drywall.
  - .5 Rim Panic Device strikes shall be mortise type application. Equip panic devices with hex bolts.
- .18 Hinges
- .1 Provide mortise type hinges, steel based for interior doors and stainless steel or brass for exterior doors or interior doors exposed to moisture.
  - .2 Provide hinges with stainless steel pins; non removable for exterior and public interior exposure, non rising for non security exposure.
  - .3 Provide full length continuous geared hinges, continuous pin and barrel hinges or full mortise type heavy weight butt hinges on all high frequency use or extreme weighted doors.
  - .4 Where doors are required to swing 180 degrees, provide ball bearing type swing clear hinges sufficient to clear trim.
- .19 Locks, Cylinders, Latches and Bolts
- .1 Locks are to be ANSI Grade 1 mortise type unless specified otherwise.
  - .2 Equip all locks with anti-friction latches with auxiliary latch guard. All fire rated doors must have a minimum latch throw as indicated on the fire door label.
  - .3 Where lever trim is required, provide levers containing concealed mounting and constructed of solid cast or forged material.
  - .4 Locks must be lever type.
  - .5 Provide locks in accordance with current barrier free accessibility requirements as set out by the OBC or by the jurisdiction having authority, when located in the barrier free path of travel.
  - .6 Strikes shall be ANSI standard size with curved lip strikes for latch bolts and no lip strikes for deadlocks. Provide complete with wrought iron boxes finished to match strike.
  - .7 Provide Cylinders and thumb turns with the correct cam or tailpiece to operate hardware correctly. Coordinate with Section 08 41 13 Aluminum Framed Entrances and Storefronts when applicable.
  - .8 Automatic flush bolts are to be equipped on all fire rated pairs of doors with regular use. Provide a coordinator in conjunction with automatic flush bolts.
  - .9 Provide a filler bar when using coordinators for a clean architectural appearance.
- .20 Exit Device
- .1 All exit devices installed on labelled fire doors shall carry a ULC or Warnock Hersey Label.
  - .2 Coordinate exit devices with astragals, coordinators, carry open bars and thresholds for correct and safe operation.
  - .3 All exit devices shall have exposed metal to match architectural finishes used on other hardware.
  - .4 Exit devices are push pad style only.

- .5 Provide non-fire rated exit devices with hex key dogging feature (Cylinder dogging may be required in lieu of hex key dogging).
- .6 Provide Power supplies of same manufacturer when using electrified exit devices.
- .7 Match style and finish of trims on exit devices for locksets used.
- .21 Closers
  - .1 All closers shall be hydraulically controlled and full rack and pinion in operation.
  - .2 All closers shall be fully adjustable including the following features: back check, speed control, and latch speed control.
  - .3 Provide mounting plates where required on special frame applications.
  - .4 Install all necessary attaching brackets, mounting channels, and cover plates where necessary for correct application of door closers.
  - .5 Supply to the Owner any special keys and wrenches as usually packed with door closers.
  - .6 Closers complete with a cover unless specified otherwise by the Consultant. Provide cover of matching architectural finish to the other hardware used in the project.
  - .7 Coordinate closers with overhead stops & holders.
- .22 Push Plates and Door Pulls
  - .1 Provide and install stainless steel plates in type #304 stainless steel and install secure with screw fastening.
  - .2 Length of kick plates shall be 1-1/2" less than door width for single doors and 1" less than door width for doors in pairs.
  - .3 All stainless steel plates are 0.050" thick, free of rough or sharp edges. Corners and edges to have slight radiuses. Install kick plates and armor plates on both sides of the door with 3M tape or counter sunk screws as specified.
  - .4 Where door pulls are scheduled on one side of door and push plates on other side, issue installations instructions to ensure that the pull is secured through door from reverse side and countersunk flush with door installation of push plate. Locate push plate to cover fasteners for door pulls.
- .23 Door Stops and Holders
  - .1 Wall stops are only to be used on wall conditions such as block or masonry. If necessary to mount on drywall, provide proper backing to ensure no damage to the wall.
  - .2 Supply floor stops of sufficient height to suit floor conditions and the undercut of the door.
  - .3 Provide gray rubber exposed resilient parts.
  - .4 Surface mount overhead door stops may be used unless they conflict with the door closer. All overhead stops are to be set to 90 degree opening unless stated otherwise.

## 2.2 HARDWARE FINISHES

- .1 P - Primed
- .2 32D - Brushed Stainless Steel
- .3 AL - EN - Aluminum Paint
- .4 26D - Brushed Chrome
- .5 15 - Brushed Nickel
- .6 28 - Anodized Aluminum
- .7 CAD - Cadmium Plated
- .8 26 - Polished Chrome

- .9 3 - Polished Brass
- .10 EAB - Brass Paint
- .11 BRN – Brown
- .12 630 – Stainless Steel

3 Execution

**3.1 INSTALLATION**

- .1 Subcontractor installing the hardware shall carefully follow manufacturers' instructions for installation of all finish hardware.
- .2 For mounting heights of various hardware items refer to the following;
  - .1 Locksets: 1024mm (40-5/16") from centre of knob to finished floor.
  - .2 Deadlocks: 1220mm (48") from centre of cylinder to finished floor.
  - .3 Mortise Night Latches: 1024mm (40-5/16") from centre of cylinder to finished floor.
  - .4 Panic Bolts: 1024mm (40-5/16") from centre of crossbar to finished floor.
  - .5 Push Plates: 1143mm 45" from centre of plate to finished floor.
  - .6 Guard Bars: 1024mm (40-5/16") from centre of bar to finished floor.
  - .7 Door Pulls: 1067mm (42") from centre of pull to finished floor.
  - .8 Blank Strike: 1024mm (40-5/16") from centre of strike to finished floor.
  - .9 Blank Fronts: 1024mm (40-5/16") from centre of strike to finished floor.

**3.2 PERFORMANCE**

- .1 Adjust and Clean:
  - .1 Provide services of competent mechanic without additional cost to Owner. Mechanic shall inspect installation of all hardware furnished under this Section and supervise all adjustments (by trades responsible for fixing) necessary to leave hardware in perfect working order.

**END OF SECTION**



1 General

**1.1 SUMMARY**

- .1 Supply and installation of automatic swing door operator, surface mounted onto suitable transom, and complete with accessories required for complete finish, installation and operation.

**1.2 RELATED REQUIREMENTS**

- .1 Section 08 11 13: Steel Doors and Frames
- .2 Section 08 41 13: Aluminum Framed Entrances and Storefronts
- .3 Section 08 70 00: Hardware

**1.3 REFERENCE STANDARDS**

- .1 American Association of Automatic Door Manufacturers (AAADM)
- .2 American National Standards Institute (ANSI):
  - .1 ANSI A156.19 – Power Assist and Low Energy Power Operated Doors
  - .2 ANSI 117.1 – Accessible and Usable Buildings and Facilities
- .3 Builders' Hardware Manufacturers Association (BHMA)
- .4 Underwriters Laboratory Canada (ULC)
- .5 Canadian Standards Association (CSA)
- .6 National Fire Protection Association (NFPA)
- .7 International Code Council (ICC)

**1.4 SYSTEM DESCRIPTION**

- .1 Performance Requirements:
  - .1 Design system to operate, hold open and close doors under design wind and suction loads calculated in accordance with applicable code.
  - .2 Provide for thermal expansion and contraction of door and frame units, transmitted to operating equipment.
  - .3 Provide for dimensional distortion of components during operation.
  - .4 Operating Temperature Range: -33 deg. C to 72 deg. C ambient.
  - .5 Eliminate system performance interference by ambient light and radio frequencies.
  - .6 Provide for manual open and close operation of door leaves in the event of power failure.

**1.5 QUALITY ASSURANCE**

- .1 Manufacturer's Qualifications: Manufacturer to have at least (5) five years experience in the fabrication of automatic and manual entrance systems.
- .2 Subcontractor executing work of this Section shall have had a minimum five (5) years continuous Canadian experience in successful manufacture and installation of work of type and quality shown and specified. Submit proof of experience upon Consultant's request.
- .3 The installation shall be in conformity with laws, by-laws and regulations which govern the design and installation of automatic entrance doors.
- .4 Installer's Qualifications: Products specified shall be represented by a factory authorized and trained distributor. Distributor shall be AAADM Certified and maintain a parts inventory and trained service personnel capable of providing service

- .5 Pre-installation Conference:
  - .1 Schedule a pre-installation conference no later than one week prior to commencing work of this Section.
  - .2 Contact Contractor two weeks prior to proposed meeting to confirm schedule.
- .6 All automatic equipment to comply with UL325 and CAN/CSA-C22.2 No 247-92.
- .7 All automatic equipment to comply with ANSI A156.19.

#### 1.6 SUBMITTALS

- .1 Submit submittals in accordance with the General Conditions and Section 01 33 00.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
  - .1 Product Data: Submit product data indicating installation details, material descriptions, dimensions of individual components and profiles, and finishes.
  - .2 Shop Drawings: Submit shop drawings indicating details of electrified door hardware including, but not limited to, the following:
    - .1 Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer installed and site installed wiring.
    - .2 Submit complete elevations, details and methods of anchorage to location; installation of hardware; size, shape, joints and connections; and details of joining with other construction.
  - .3 Templates and Diagrams: As needed shall be furnished to fabricators and installers of related work for coordination of swinging door system with concrete work, electrical work, and other related work.
  - .4 Samples: Submit to Consultant for approval, before fabrication of the work, samples of materials, components, and finishes to be used in the work.
  - .5 Maintenance Data and Operating Instructions: On completion of work of this Section, supply three (3) copies of maintenance instructions for insertion into Operating and Maintenance Manual.

#### 1.7 PROJECT CLOSEOUT SUBMISSION

- .1 Operation and Maintenance Data: Provide operations and maintenance information in accordance with Section 01 33 00.
- .2 Spare Parts and Tools: Submit unique parts and tools for maintaining hardware system in accordance with Section 01 33 00.

#### 1.8 DELIVERY, HANDLING AND PROTECTION

- .1 Pack hardware in suitable wrappings and containers to protect from injury during shipping and storage. Enclose accessories, fastening devices and other loose items with each item. Mark packages for easy identification as indicated on approved delivery schedule. Hand over hardware to designated installer.

#### 1.9 SITE CONDITIONS

- .1 Site Survey: Verify site conditions including, but not limited to the following; opening sizes, floor conditions, plumb and level mounting surfaces.
  - .1 Substrates shall be of proper dimension and material.
- .2 Coordinate installation with glass, glazing hardware and electrical to avoid construction delays.

## 1.10 WARRANTY

- .1 Warrant work of this Section against defects in materials and workmanship in accordance with the General Conditions, but for a period of two (2) years and agree to promptly make good defects which become evident during warranty period without cost to the Owner.
- .2 Warrant that any unit failing shall be removed and replaced without cost to the Owner.

## 2 Products

### 2.1 MANUFACTURERS

- .1 Supply all automatic door operators and accessories from one manufacturer to ensure compatibility of system components.
- .2 Acceptable Materials Manufacturers: Subject to compliance with requirements specified in this Section, manufacturers offering products that may be incorporated into the Work include; but are not limited to, the following:
  - .1 Besam Ltd.
  - .2 Horton Automatics
  - .3 Gyro Tech Inc
  - .4 Record-USA

### 2.2 AUTOMATIC SWING DOOR SYSTEM

- .1 Coordinate the work of all trades, including glass and glazing, masonry, and electrical requirements covered in manufacturer's details and appropriate sections of the specifications.
- .2 Coordinate with electrical contractor for provision of service to each operator from junction box for multiple operators.
- .3 Coordinate with electrical contractor and provide electrical conduit and wiring from specified controls to operators as outlined on manufacturer's drawings.
- .4 Finish Hardware Supplier: Provide and install the following automatic door operators and connecting hardware, and power on/off switch and safety sensor.
  - .1 Overhead Concealed Side Access (Type A): Provide and install overhead concealed swing door operator, for single or double doors, consisting of operator and electronic control, aluminum header.
    - .1 Basis of Design Material: Besam SW200i-OS by ASSA ABLOY.
  - .2 Surface Mount Single Push (Type B): High performance, heavy use application, surface mounted operator, complete with aluminum header case and arm link.
    - .1 Basis of Design Material: Besam SW200i by ASSA ABLOY.
  - .3 Automatic entrance equipment: comply with ANSI A156.10 or A156.19.
  - .4 Aluminum header extrusions: minimum nominal 4 mm wall thickness with finish anodized AA-M12-C22-A31 clear.
  - .5 Equipment must operate between -35 deg. C and +55 deg. C in all climate conditions.
  - .6 Operator: Electro-mechanical system installed in a header to resist dust, dirt and corrosion; entire operator shall be removable from the header as a unit.
  - .7 Bearings: Fully lubricated and sealed to minimize wear and friction.

- .5 Electrical Control:
  - .1 Solid-state microprocessor unit, allowing the opening speed, closing speed, back check and latch check speed each to be adjusted separately and independently from each other to meet specific site conditions.
  - .2 Adjustable opening and closing speeds shall be set in accordance with ANSI A156.19.
  - .3 Control shall include time delay. All adjustments shall be specific and reproducible.
- .6 The door forces and speeds generated during power opening, and manual opening in both directions of swing, and spring closing in both directions of swing shall conform to the requirements of ANSI A156.10 or A156.19.
- .7 Verify that no defects or errors are present in completed phases of the work that would result in poor application or installation, or cause latent defects of the automatic door equipment.
- .8 Installation and warranty adjustments shall be performed by authorized distributors' factory trained technician.

### **2.3 ACTIVATING DEVICES**

- .1 Wall Switches: Round push plate switch, 150mm (6") diameter stainless steel surface, engraved, mounted to pushbutton box, mounted to wall or frame, as indicated on the drawings.

### **3 Execution**

#### **3.1 INSTALLATION**

- .1 Automatic door equipment shall be installed by AAADM Certified, factory-trained installers in compliance with ANSI A156.19, manufacturer's recommendations and approved shop drawings.

#### **3.2 CLEANING AND PROTECTION**

- .1 After installation, clean framing members as recommended by the manufacturer.
- .2 Protect aluminum surfaces in contact with masonry, concrete or steel by use of neoprene gaskets, where indicated, or a coat of bituminous paint to prevent galvanic or corrosive action.
- .3 Advise general contractor to protect unit from damage during subsequent construction activities.

#### **3.3 PERFORMANCE**

- .1 Provide services of certified technician without additional cost to Owner, to inspect and adjust installation of all hardware furnished under this Section to assure compliance with ANSI A156.10.

**END OF SECTION**

1 General

**1.1 SUMMARY**

- .1 Furnish glazing materials and accessories to complete the fabrication and installation of:
  - .1 Hollow Metal Doors, Frames and Sidelights
  - .2 Aluminum Swing Doors
  - .3 Storefront Glazing

**1.2 RELATED REQUIREMENTS**

- .1 Section 06 10 00: Rough Carpentry
- .2 Section 07 92 00: Sealants
- .3 Section 08 11 13: Steel Doors and Frames
- .4 Section 08 41 13: Aluminum Framed Entrances and Storefronts

**1.3 REFERENCE STANDARDS**

- .1 American Society for Testing and Materials (ASTM):
  - .1 ASTM C542-05(2011), Standard Specification for Lock-Strip Gaskets
  - .2 ASTM C920-11, Standard Specification for Elastomeric Joint Sealants
- .2 Canadian General Standards Board (CGSB):
  - .1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass
  - .2 CAN/CGSB-12.3-M91, Flat, Clear Float Glass
  - .3 CGSB-12.20-M89, Structural Design of Glass for Buildings

**1.4 SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
  - .1 Product Data: Submit manufacturer's product data for each type of product specified. Data shall indicate compliance with specification and installation recommendations of manufacturer of products being used.
  - .2 Samples: Submit samples of materials if required by Consultant before commencing work of this section. Samples shall be clearly labeled with manufacturer's name and type.
  - .3 Shop Drawings: Submit shop drawings, to the Consultant for review prior to fabrication.
  - .4 Maintenance Data: Upon completion of installation, supply instructions covering re-glazing, adjustments and other relevant maintenance data.

**1.5 QUALITY ASSURANCE**

- .1 Conform to the requirements of the Flat Glass Marketing Association Glazing Manual, latest Edition.

**1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Delivery and Acceptance Requirements: Deliver packaged materials in their original containers with manufacturer's labels and seals intact.
- .2 Storage and Handling Requirements: Store vertically, blocked off the floor in a weatherproof enclosure in original containers with manufacturers labels and seals intact until read for installation, and as follows:
  - .1 Install glass as soon as possible after delivery to site.

- .2 Handle glass carefully to its place of installation.
- .3 Prevent damage to glass, adjacent materials and surfaces.

## 1.7 SITE CONDITIONS

- .1 Ambient Conditions: Maintain temperature, humidity and solar exposure conditions of Glass Glazing materials during shipping, storage and site installation as required by manufacturer to maintain warranty and performance of installed products.

## 2 Products

### 2.1 MATERIALS

- .1 Float Glass: In accordance with CAN/CGSB-12.3, glazing quality and as follows:
  - .1 Clear Glass: No tint
- .2 Tempered Glass:
  - .1 Minimum 1/4" thick, clear, conforming to CAN/CGSB-12.1, Type 2, Class 'B'. Tempering shall be performed using horizontal tong free method. Provide 1/2" where indicated on drawings.
- .3 Gaskets:
  - .1 Neoprene/EPDM thermoplastic rubber type gaskets of sufficient thickness to be compressed 25% when installed, having 2,000 psi tensile strength, with 50 durometer shore A hardness plus/minus 5, maximum 30% resistance to permanent set, resistance to ozone without cracking, minimum elongation at break of 300% and conforming to ASTM C542.
  - .2 Colour - "Black".
- .4 Sealant:
  - .1 One component, silicone base, solvent curing sealant conforming to ASTM C920. Colour as selected Later by Consultant.
- .5 Glazing Compound:
  - .1 Non-hardening modified oil type glazing compound.
- .6 Setting Blocks:
  - .1 Neoprene/EPDM rubber type, 4" long, with 40 to 50 durometer shore A hardness plus/minus 5; resistant to sunlight, weathering, oxidation and permanent deformation under load and wide enough to extend from fixed stop to opposite face of glass of thickness suitable to glazing condition to provide adequate glazing "bite".
- .7 Spacer Shims:
  - .1 Neoprene/EPDM rubber type, with 40 to 50 durometer shore A hardness plus/minus 5; resistant to sunlight, weathering, oxidation and permanent deformation under load and of adequate thickness to provide correct glass to face clearance at least 1/8".
- .8 Glazing Tape:
  - .1 Macro-polyisobutylene preformed glazing tape, 'Polyshim' or 'Vision Strip' by Tremco Ltd., division of RPM Company, or approved equal.

### 2.2 FABRICATION AND MANUFACTURE

- .1 Label each light of glass with the registered name of the product and the weight and quality of the glass.
- .2 Check dimensions on site before cutting materials.

- .3 Minimum bite or lap of glass on stops and rabbets as recommended by glass manufacturer. Finish surfaces shall be free of tong marks.
- .4 Cut glass true to dimensions, square, plumb and level. Verify all dimensions prior to fabrication.
- .5 Distortion, pock marking or defects detrimental to appearance and/or performance, as determined by the Consultant, will be rejected.

3 Execution

**3.1 EXAMINATION**

- .1 Examine areas of work affecting the work of this section. Report in writing all defects, errors and discrepancies immediately to the Consultant.
- .2 Commencement of work implies acceptance of surfaces and conditions.

**3.2 PREPARATION**

- .1 Openings shall be free from moisture, frost, rust, dirt and foreign matter.
- .2 Clean surface to receive sealant with a clean cloth dampened with xylol or a 50-50 mixture of acetone and xylol. Wipe dry with a clean, dry cloth.

**3.3 INSTALLATION**

- .1 Conform to the recommendation of the glazing manual, Flat Glass Marketing Association, latest edition and as specified herein.
- .2 Unless otherwise indicated on drawings otherwise, provide tempered glass at all doors, transoms, sidelights and vision lites within 2'-6" of grade and/or finished floor.
- .3 Glaze doors scheduled to be glazed.
- .4 Set sheet glass with draw lines horizontal.
- .5 Glaze interior openings using compound or glazing tapes or gaskets.
- .6 Install removable stops. Insert spacer shims between glass and stops at 24" O.C. and not less than 1/4" below "sight lines". Fill remaining voids with sealant or glazing compound to "sight lines" and trim sealant/glazing compound to produce clean, sharp, straight lines without voids or depressions.
- .7 Replace loose stops in their original positions, tighten all screws.
- .8 Refer to drawings and door and frame schedule for locations of each type of glass.

**3.4 CLEANING**

- .1 Repair all defects caused by the work of this section. Remove as work progresses, all excess or foreign materials or droppings which would set or become difficult to remove from surfaces at time of final cleaning.
- .2 Immediately prior to acceptance of work of this section by Consultant, remove temporary protection, clean and polish exposed surfaces of all work of this section. Use proper cleaning materials and methods to prevent damage to surfaces, finishes, sealer or work of other trades. Make good such damage to Consultant's satisfaction.
- .3 Do not use steel wool, wire brushes or steel scrapers on any finished surfaces.
- .4 Replace or make good to Consultant's satisfaction, upon completion of work of this section, all defective, scratched or damaged work, at no extra cost to the Owner.

**3.5 GLAZING SCHEDULE**

- .1 Steel Door and frames and Borrowed Lights:
  - .1 Single 10mm" clear tempered safety glazed light, as indicated.
- .2 Aluminum Entrances and Framing:
  - .1 Interior vestibules: Single 10mm clear tempered safety glazing.
- .3 Other glass types as indicated on drawings.

**END OF SECTION**



1 General

**1.1 SUMMARY**

- .1 This Section includes requirements for supply and installation of glazing films for aesthetics; visual markers.

**1.2 RELATED SECTIONS**

- .1 Section 08 80 00: Glazing

**1.3 REFERENCE STANDARDS**

- .1 American Society for Testing and Materials (ASTM):
  - .1 ASTM D1004-09, Standard Test Method for Initial Tear Resistance of Plastic Film and Sheeting
  - .2 ASTM D3330/D3330M-04 (2010), Standard Test Method for Peel Adhesion of Pressure-Sensitive Tape

**1.4 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination: Coordinate the Work of this Section with the installation of glazing; sequence work so that installation of glazing films coincides with installation of glass materials without causing delay to the Work.
- .2 Pre-Installation Conference: Conduct on site pre-installation conference in accordance with Section 01 31 19 – Project Meetings before installing glazing films and in conjunction with installation of mock-up attended by Contractor, Consultant, Owner, glazing film Installer and glazing film manufacturer's representative to:
  - .1 Review methods and procedures related to installation, including manufacturer's written instructions
  - .2 Examine substrate conditions for compliance with manufacturers installation requirements
  - .3 Review temporary protection measures required during and after installation.

**1.5 SUBMITTALS**

- .1 Provide required information in accordance with Section 01 33 00.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
  - .1 Verification Samples: Submit 300 mm x 300 mm sample of each type of film to the Consultant.

**1.6 PROJECT CLOSEOUT SUBMISSIONS**

- .1 Operation and Maintenance Data: Submit manufacturer's written instructions for cleaning solutions, materials and procedures, include name of original installer and contact information in accordance with Section 01 33 00.

**1.7 QUALITY ASSURANCE**

- .1 Qualifications: Provide proof of qualifications when requested by Consultant:
  - .1 Installer: Use installers having experience with projects of similar extent and complexity and that have experience laminating film to glass on site for a minimum of five (5) years.

**1.8 MOCK-UPS**

- .1 Provide required Sample Installation in accordance with Section 01 45 00 – Quality Control.

- .2 Sample Installation: Install a sample on site using materials representative of the actual materials being installed:
  - .1 Sample will be reviewed by the Consultant; acceptable installation can form a permanent part of the Work when found acceptable by the Consultant, and will form the basis for acceptance for the remainder of the project.
  - .2 Remove and replace materials found not acceptable at no cost to Owner or Consultant.

### 1.9 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: Deliver and store packaged materials in their original containers with manufacturer's labels and seals intact; store as recommended by manufacturer in a weatherproof enclosure.

### 1.10 SITE CONDITIONS

- .1 Ambient Conditions: Proceed with film installation when ambient and substrate temperature conditions are within limits permitted by manufacturer and when glass substrates are free from wetness arising from frost, condensation, or other causes detrimental to adhesion.

## 2 Products

### 2.1 MANUFACTURERS

- .1 Basis-of-Design Products: Products named in this Section were used as the basis-of-design for the project; additional manufacturers offering similar products may be incorporated into the work of this Section
- .2 Acceptable Materials Manufacturers: Subject to compliance with requirements specified in this Section and as established by the Basis-of-Design Materials, manufacturers offering products that may be incorporated into the Work include the following:
  - .1 Llummar Window Film
  - .2 Avery Dennison Graphics
  - .3 3M Window Film Solutions

### 2.2 GLAZING FILMS

- .1 Frosted Glass Decorative Texture Glazing Film: Single layer decorative cast film with pressure sensitive ultraviolet resistant adhesive and scratch resistant coating; computer generated and cut and as follows:
  - .1 Characteristics:
    - .1 % Visible Light Transmission: 88
    - .2 Privacy Film Rating: 5
    - .3 Film Colour: Frosted Glass
  - .2 Basis-of-Design Materials: LLumar Frosted Glass Decorative Texture Film by LLumar.

## 3 Execution

### 3.1 EXAMINATION

- .1 Examine glass and surrounding adjacent surfaces for conditions affecting installation; proceed with installation after verification and correction of surface conditions acceptable to manufacturer.

### 3.2 PREPARATION

- .1 Prepare glazing films using computer generated CNC cutting methods to eliminate any cutting of films directly on glass at project site.

- .2 Clean glass surfaces of substances that could impair glazing film bond including mould, mildew, oil, grease, dirt and other foreign materials immediately before beginning installation of films.
- .3 Protect window frames and surrounding conditions from damage during installation.

### 3.3 INSTALLATION

- .1 Install in accordance with the manufacturer's written instructions and the contract documents, plumb, true, and level over clean glazing.
- .2 Install film continuously, but not necessarily in one continuous length, with no gaps or overlaps and as follows:
  - .1 Install seams vertical and plumb where necessary; horizontal seams will not be allowed.
  - .2 Do not remove release liner from film until just before each piece of film is cut and ready for installation.
  - .3 Install film with mounting solution and custom cut to the glass with neat, square corners and edges to within 3 mm of window frame.
  - .4 Remove air bubbles, wrinkles, blisters, and other defects.
- .3 Installation Tolerances: Consultant will view film installation from a distance of 3 metres against a bright uniform sky or background and will accept installation where it appears uniform in appearance with no visible streaks, banding, thin spots or pinholes; remove and replace with new film when directed by the Consultant for materials not meeting requirements.

**END OF SECTION**

1 General

**1.1 SUMMARY**

- .1 This Section includes requirement for supply and installation of components required for a complete wall and ceiling assembly with proprietary components as follows:
  - .1 Non-Loadbearing Steel Framing:
    - .1 Metal Studs
    - .2 Floor and Ceiling Partition Track
    - .3 Furring Members
    - .4 Drywall Grid Suspension for Ceilings
  - .2 Gypsum board panels:
    - .1 Standard Gypsum Wallboard
    - .2 Fire-Rated Gypsum Board 'Type X'
    - .3 Gypsum Ceiling Board
  - .3 Gypsum Wallboard Accessories:
    - .1 Screws, tape, joint compound and all other accessories required for gypsum board ceiling and wall partitions.
    - .2 Access Panels.

**1.2 RELATED REQUIREMENTS**

- .1 Section 05 50 00: Miscellaneous Metals
- .2 Section 06 10 00: Rough Carpentry
- .3 Section 07 84 00: Firestopping and Smoke seals
- .4 Section 07 92 00: Sealants
- .5 Section 08 11 13: Steel Doors and Frames
- .6 Section 08 41 13: Aluminum Framed Entrance and Storefronts
- .7 Section 09 90 00: Painting

**1.3 REFERENCE STANDARDS**

- .1 Canadian Standards Association (CSA):
  - .1 CSA S136-07, North American Specification for the Design of Cold-Formed Steel Structural Members.
- .2 Canadian General Standards Board (CGSB):
  - .1 CAN/CGSB-7.1-98, Lightweight Steel Wall Framing Components
- .3 American Society for Testing and Materials International (ASTM):
  - .1 ASTM A641/A641M-09a, Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
  - .2 ASTM A653/A653M-11 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .3 ASTM A792/A792M-10, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
  - .4 ASTM A875/A875M-10, Specification for Steel Sheet, Zinc-5% Aluminum Alloy-coated by the Hot Dip Process.

- .5 ASTM A1003/A1003M-12, Specification for Steel Sheet, Carbon, Metallic and Non-Metallic Coated for Cold Formed Framing Members.
- .6 ASTM C11-10a, Standard Terminology Relating to Gypsum and Related Building Materials.
- .7 ASTM C473-12, Standard Test Methods for Physical Testing of Gypsum Panel Products.
- .8 ASTM C475/C475M-12, Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- .9 ASTM C514-04(2009)e1, Standard Specifications for Nails for the Application of Gypsum Board.
- .10 ASTM C645-11a, Standard Specification for Nonstructural Steel Framing Members.
- .11 ASTM C665-12, Standard Specification for Mineral-Fibre Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- .12 ASTM C754-11, Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- .13 ASTM C834-10, Standard Specification for Latex Sealants.
- .14 ASTM C840-11, Standard Specification for Application and Finishing of Gypsum Board.
- .15 ASTM C841-03(2008)e1, Standard Specification for Installation of Interior Lathing and Furring.
- .16 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" to 0.112" in Thickness.
- .17 ASTM C955-11c, Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases
- .18 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.
- .19 ASTM C1047-10a, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
- .20 ASTM C1396/C1396M-11, Standard Specification for Gypsum Board.
- .21 ASTM D3273-12, Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- .22 ASTM D3274-09, Standard Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Fungal or Algal Growth, or Soil and Dirt Accumulation.
- .23 ASTM D3678-97(2008)e1, Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Interior-Profile Extrusions.
- .4 Gypsum Association (GA):
  - .1 GA-214-10, Recommended Levels of Gypsum Board Finish.
  - .2 GA-216-10, Application and Finishing of Gypsum Board.
  - .3 GA-231-06, Assessing Water Damage to Gypsum Board.
  - .4 GA-238-03, Guidelines for the Prevention of Mold Growth on Gypsum Board.

#### 1.4 QUALITY ASSURANCE

- .1 Contractor executing work of this Section shall have a minimum of five (5) years continuous Canadian experience in successful installation of work of type and quality shown and specified. Submit proof of experience upon Consultant's request.

#### 1.5 SUBMITTALS

- .1 Submit submittals in accordance with the requirements of the General Conditions and Section 01 33 00.
- .2 Shop Drawings: Submit shop drawings showing the design, construction and relevant details of furring, enclosures and partitions which require a fire rating.
- .3 Product Data: Submit manufacturer's current technical literature for each component.
- .4 Samples: Supply for Consultant's review, if requested, samples of the following:
  - .1 Board: Submit sample of each panel product specified, 150mm (6") square.
  - .2 Trim: Submit sample of each type of trim specified, 305mm (12") long.
- .5 Quality Assurance Submittals:
  - .1 Design Data, Test Reports: Provide manufacturer's test reports indicating product compliance with indicated requirements.
  - .2 Manufacturer's Instructions: Provide manufacturer's written installation instructions.

#### 1.6 DELIVERY, STORAGE, HANDLING AND PROTECTION

- .1 Coordinate deliveries to comply with construction schedule and arrange ahead for off the ground, enclosed, under cover storage location. Do not load any area beyond the design limits.
- .2 Materials shall be carefully checked, unloaded, stored and handled to prevent damage. Protect materials with suitable non-staining waterproof coverings.
- .3 Store material in original, undamaged containers or wrappings with manufacturer's seals and labels intact, in accordance with GA-238 and manufacturer's recommendations.
- .4 Protect bagged products from excessive moisture or wetting. Store metal component sections in crates to prevent damage to material. Do not use bent or deformed material.

#### 1.7 PROJECT CONDITIONS

- .1 Establish and maintain environmental conditions for application and finishing gypsum wallboard to comply with ASTM C 840 and in accordance with manufacturer's written instructions.
- .2 In cold weather (outdoor temperatures less than 13 deg. C, controlled heat in the range of 13 deg. C to 21 deg. C must be provided. This heat must be maintained both day and night, 24 hours before, during, and after entire gypsum board joint finishing and until the permanent heating system is in operation or the building is occupied. Minimum temperature of 10 deg. C shall be maintained during gypsum board application.
- .3 Ventilate building spaces to remove excess moisture and humidity during the drying process. Avoid drafts during dry, hot weather to prevent materials from drying too rapidly.

#### 2 Products

##### 2.1 MATERIALS - WALLBOARD

- .1 Standard Gypsum Wallboard:
  - .1 Conforming to ASTM C1396, ivory paper faced, tapered edges, 1220mm (48") wide sheets of maximum practical lengths to minimize end joints, 1/2" thick unless indicated otherwise on drawings.
    - .1 Sheetrock Brand Gypsum Panels by CGC Inc.

- .2 ProRoc Regular by CertainTeed.
- .3 ToughRock Gypsum Wallboard by Georgia-Pacific Canada.
- .2 Fire-Rated Gypsum Board 'Type X':
  - .1 Conforming to ASTM C1396, 1220mm (48") wide sheets of maximum practical lengths to minimize end joints, tapered edges, 16mm (5/8") thick, as indicated on drawing.
    - .1 Sheetrock Brand Gypsum Panels, Firecode Core by CGC Inc.
    - .2 ProRoc Type X by CertainTeed.
    - .3 ToughRock Fireguard Gypsum Board by Georgia-Pacific Canada.
  - .3 Gypsum Ceiling Board:
    - .1 Sag Resistant Gypsum Board: Meeting requirements of ASTM C1396M, ceiling board manufactured to have more sag resistance than regular type gypsum board with long edges tapered, and as follows:
      - .1 Location: Ceiling surfaces.
      - .2 Acceptable Materials:
        - .1 Sheetrock Interior Ceiling Board by CGC Inc.
        - .2 Tough Rock CD Ceiling Board by Georgia Pacific Canada.
        - .3 ProRoc Interior Ceiling Board by CertainTeed.

## 2.2 MATERIALS - STEEL FRAMING

- .1 Non-Loadbearing Steel Framing:
  - .1 General:
    - .1 Steel sheet components shall comply with ASTM C645 requirements for metal, unless otherwise indicated.
    - .2 Steel for non-loadbearing members shall have metallic coats that conform to ASTM A653M or ASTM A792M with minimum metallic coating weighs (mass) of Z120 and AZM150 respectively.
    - .3 Framing members shall comply with the CAN/CSA S136 - North American Specification for the Design of Cold Formed Steel Structural Members, for conditions indicated.
    - .4 Isolate where necessary to prevent electrolysis due to dissimilar metal-to-metal contact or metal-to-masonry and concrete contact. Use bituminous paint, butyl tape or other approved divorcing material.
  - .2 Metal Studs:
    - .1 Minimum 0.0179" (25 gauge), screwable with crimped web and returned flange. Provide knockout openings in web at 150mm (6") O.C. to accommodate (if required) horizontal mechanical and electrical service lines, and bracing. Widths as indicated on drawings. Provide structural studs where indicated.
    - .2 Framing behind all fire resistant gypsum board shall be minimum 0.0329" (20 gauge).
    - .3 Where metal stud framing forms walls are to be thermally insulated as indicated on drawings, provide metal studs with integrated fastening system for glass fibre/mineral fibre insulation.
    - .4 Provide special shapes indicated on drawings as part of steel stud/drywall assemblies.

- .3 Floor and Ceiling Partition Track:
  - .1 Made from galvanized sheet steel, minimum 0.0179" (25 gauge), with minimum 30mm (1-3/16") legs, top track having longer legs were required to compensate for deflection of structure above. Width to suit metal studs.
- .4 Furring Members:
  - .1 Hat-shaped, rigid furring channels shall comply with the ASTM C645 and shall have a minimum base steel thickness of (25 gauge) and a minimum depth of 22mm (7/8") the minimum width of furring attachment flanges shall be 13mm (1/2").
  - .2 Resilient furring channels designed to reduce sound transmission shall have a minimum base steel thickness of 0.0179" (25 gauge) and have a minimum depth of 13mm (1/2").
  - .3 Furring members shall be used for furring out any surface for application of gypsum wallboard finish and for secondary furring member in suspended ceilings/soffits.
  - .4 All furring members shall be hot-dipped galvanized.
- .5 Drywall Grid Suspension for Ceilings: Conforming to ASTM C645 and ASTM C754, direct hung system composed of main beams and cross furring members that interlock and as follows:
  - .1 Tie Wire: Tie wire shall comply with ASTM A641/A641M zinc-coated, soft annealed.
    - .1 8 gauge used for hangers in suspended ceiling grid work.
    - .2 12 gauge for drywall suspension system.
    - .3 18 gauge for wire-tying channels in wall furring and ceiling construction.
  - .2 Furring Runners: Manufactured from 0.020" thick steel, 35mm (1-3/8") wide with knurled face by 38mm (1-1/2") high by 305mm (12') long, with factory punched cross tee slots, hanger holes and non-directional bayonet end tab couplings.
  - .3 Furring Tees: Manufactured from 0.0179" (25 gauge) thick steel, 35mm (1-3/8") wide with knurled face by 38mm (1-1/2") high by 1220mm (4') long with stab-type end tab couplings, with factory punched cross tee slots, and hanger holes.
  - .4 Furring Cross Channels: Manufactured from 0.0179" (25 gauge) thick steel, 35mm (1-3/8") wide with knurled face by 22mm (7/8") high by 1220mm (4') long with straight locking end tabs.
  - .5 Cross Tees: Manufactured from 0.0179" (25 gauge) thick steel, 24mm (15/16") wide by 22mm (7/8") high by 1220mm (4') long with stab-type end tab couplings, with factory punched cross tee slots, and hanger holes.
  - .6 Wall Track: Manufactured from 0.0179" (25 gauge) thick steel, 39mm (1-9/16") high by 3048mm (10') long with a 25mm (1") top and bottom flange.
  - .7 Basis of Design System: 660-C Stab Drywall Grid Suspension System by Rockfon, or acceptable equivalent by Armstrong World Industries Inc., as approved by the Consultant.

## 2.3 ACCESSORIES

- .1 Concrete Anchors:
  - .1 Self-drilling tie wire anchors, "Red-Head No. T-32" by Phillips Drill Company, Division of ITT Industries of Canada Ltd., or approved equal.



- .2 Concrete Inserts:
  - .1 Hot-dip galvanized "turtle back" type concrete inserts to suit conditions as approved by Consultant, by Acrow-Richmond National Concrete Accessories, Division of Premetalco Inc., or approved equal.
- .3 Glass Fibre Insulation:
  - .1 Unfaced, preformed glass fibre batt insulation in accordance with CAN/ULC S702, Type 1; having a nominal RSI of 0.55/25 mm, thickness as required to meet design insulation values indicated on drawings or as required to fill insulated spaces where not indicated; formaldehyde free, manufactured using recycled glass, and as follows:
    - .2 Basis of Design Materials:
      - .1 Owens-Corning Canada Inc., Pink Fiber Glass Insulation
      - .2 Roxul Inc., Roxul Plus
      - .3 CertainTeed Sustainable Insulation
      - .4 Johns-Manville Formaldehyde Free Batt Insulation
- .4 Mineral Fibre Insulation:
  - .1 Unfaced, preformed mineral slag batt insulation in accordance with CAN/ULC S702, Type 1; having a nominal RSI of 0.67/25 mm; rated non-combustible in accordance with CAN/ULC S114 and having a flame spread rating of 5 or less in accordance with CAN/ULC S102; density 32 kg/m<sup>3</sup>; square edges, thickness as required to meet design insulation values indicated on drawings or as required to fill insulated spaces where not indicated, and as follows:
    - .2 Basis of Design Materials:
      - .1 Roxul Inc., Roxul Plus
      - .2 Fibrex, SAFB Insulation
- .5 Gypsum Wallboard Accessories:
  - .1 In general, gypsum wallboard accessories shall conform to ASTM C1047.
  - .2 Corner Beads:
    - .1 Made from galvanized steel sheet conforming to ASTM A653, minimum 0.0179" (25 gauge). Minimum width of flanges 28mm for 13mm (1-1/8" for 1/2") thick wallboard and 32mm for 16mm (1-1/4" for 5/8") thick wallboard.
  - .3 Casing Beads:
    - .1 Made from galvanized steel sheet conforming to ASTM A653, minimum 30 gauge, U-shaped designed for finishing with joint compound.
  - .4 Control Joints:
    - .1 Made from galvanized sheet steel conforming to ASTM A653, minimum 0.0179" (25 gauge), or roll-formed zinc-alloy to resist corrosion, with expansion joint material perforated flanges.
      - .1 'Zinc Control Joint No. 093' by CGC Inc.
      - .2 or approved equal.
  - .5 Reveals:
    - .1 Galvanized sheet steel conforming to ASTM A653, minimum 0.0179" (25 gauge), in profiles as indicated on drawings.

- .6 Wallboard Screws:
  - .1 Corrosion resistant, self-drilling, self-tapping gypsum wallboard screws conforming to ASTM C1002 (Type S) and ASTM C954 (Type S-12), 25mm (1") long No. 6 for single layer application, 41mm (1-5/8") long No. 7 for double layer application.
  - .2 At fire rated construction, type and size of wallboard screw shall be same as used in fire-rating test.
- .7 Joint Compound for Interior Gypsum Board:
  - .1 Conforming to ASTM C475 and as recommended by gypsum wallboard, fire-rated gypsum wallboard and exterior wallboard manufacturers to suit conditions.
- .8 Resilient Sponge Tape:
  - .1 Closed cell neoprene sponge type tape with self-sticking adhesive on one side. 'Permastik 122X' by Jacobs and Thompson Ltd., or foamed vinyl type tape, 'Arnofoam' by Arno Adhesive Tape Incorporated.
- .9 Adhesive:
  - .1 Conforming to CGSB 71-GP-25M, and as recommended by manufacturer and compatible with contacted surfaces.
- .10 Building Paper:
  - .1 No. 15 asphalt building paper conforming to CAN/CGSB-51.32-M.
- .11 Access Panels:
  - .1 Supply 610mm x 610mm (24" x 24") self framing metal access panels with integral locks as approved by Consultant, where required for access to concealed controls and equipment, by Le Hage Metal Ltd., or Acudor Products Limited, or approved equal.

### 3 Execution

#### 3.1 EXAMINATION

- .1 Examine gypsum wallboard panels for damage and existence of mould. Install only undamaged panels.
- .2 Examine gypsum wallboard in accordance with GA-231 for water damage.
- .3 Examine areas and substrates, with installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.
- .4 Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- .1 Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
- .2 Coordinate installation of gypsum board suspension systems with installation of acoustical ceiling tiles (ACT) suspension systems. Where gypsum board suspension systems abut ACT systems, ensure that ceiling tiles grid fit into gypsum grid without affecting overall design and appearance.
- .3 Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

#### 3.3 INSTALLATION - GENERAL

- .1 Conform to ASTM C840, except as otherwise specified herein. Co-operate with mechanical, electrical and other trades to accommodate fixtures, fittings and other items in wallboard areas.

- .2 Review extent of temporary heat provided. Carry out the work of this Section only when temperature is maintained and controlled in the range of 13 deg. C to 21 deg. C for at least 24-hours before installing gypsum wallboard and is maintained or can be maintained until joint compound and adhesives are dried or cured.
- .3 Metal studs in partitions and bulkheads are to be continuous to underside of steel deck, except where noted otherwise on drawings. Continue framing around ducts penetrating partitions above ceiling.
- .4 Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- .5 Install bracing at terminations in assemblies.
- .6 Do not bridge building control and expansion joints with non-loadbearing steel framing members. Frame both sides of joints independently.
- .7 Bring gypsum board into contact, but do not force into place.

### 3.4 STUD PARTITIONS

- .1 Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- .2 Provide continuous dampproof course to underside of floor track.
- .3 Install studs so flanges within framing system point in same direction.
- .4 Provide accurately aligned partition tracks at top and bottom of partitions. Secure at 610mm (24") O.C. and 50mm (2") from each end.
- .5 Erect studs vertically in partition tracks at 406mm or 610mm (16" or 24") O.C. maximum as required, and not more than 50mm (2") from abutting walls, openings and each side of corners.
- .6 Install cut to length intermediate vertical studs, in same manner and spacing as wall studs, over door frames and above and below other openings.
- .7 Door Openings:
  - .1 Extend studs on each side of openings from floor to ceiling or structure above, whichever is indicated.
  - .2 Install cut to length piece of runner horizontally over door frames.
  - .3 Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
  - .4 Install two (2) studs at each jamb, unless otherwise indicated.
  - .5 Install cripple studs at head adjacent to each jamb stud, with a minimum 13mm (1/2") clearance from jamb stud to allow for installation of control joint in finished assembly.
- .8 Other Framed Openings: Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
- .9 Fire-Resistance Rated Partitions: Install framing to comply with fire-resistance rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
- .10 Where studs extend over 3658mm (12') in height provide internal horizontal bridging spaced approximately 1220mm (4') O.C. vertically and provide double studs at each side of door frames.
- .11 Size, brace and reinforce studs as necessary to provide sturdy, rigid partitions to heights and lengths required.

- .12 Design bridging to prevent member rotation and member translation perpendicular to the minor axis. Provide for secondary stress effects due to torsion between lines of bridging. Wallboard shall not be used to help restrain member rotation and translation perpendicular to the minor axis. Maximum bridging spacing to be 1220mm (48") O.C.
- .13 Securely anchor framing to building structure making allowance for deflection of structure above with relief joint to avoid transmission of structural loads to partitions.
- .14 Where horizontal runs of service lines are to be installed, arrange with applicable trades to have lines installed prior to wallboard application.
- .15 Install each framing member so fastening surfaces vary not more than 3mm over 305mm (1/8" over 12") from the plane formed by face of adjacent framing.
- .16 Ensure close contact of surfaces. Surfaces with depression shall be built up by Contractor, or high points ground down, otherwise effectively caulk the wall perimeter to retard passage of sound waves. Provide acoustic sealant or sponge tape at junction of sound resistant walls and all other walls.

### 3.5 CEILING FURRING

- .1 Install suspension system components in sizes and spacings indicated on drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.
- .2 Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- .3 Hangers:
  - .1 Hangers for suspended gypsum wallboard ceiling, bulkheads and duct furring shall support the grillage independent of walls, columns, pipes, ducts, conduit and similar components.
  - .2 Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
  - .3 Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter splaying, or other equally effective means.
  - .4 Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
    - .1 Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
  - .5 Wire Hangers: Secure by looping and wire tying, either directly to structure or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
  - .6 Do not attach hanger to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
  - .7 Powder actuated fasteners are not approved.
  - .8 Do not attach hangers to or through steel deck. Attach hangers to steel joists. Where joist spacing is not suitable and where ducts and other equipment interfere, provide adequate cross channels between joists and securely wire tie in position for support of hangers.
  - .9 Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
  - .10 Do not connect or suspend steel framing from ducts, pipes, or conduit.

- .11 Recessed ceiling fixtures which exert a load in excess of 10 lbs/ft<sup>2</sup> (48.824 kg/m<sup>2</sup>) shall be suspended independent of ceiling furring for gypsum wallboard application.
  - .12 Prior to installation of suspension system confirm that ceiling heights called for on room finish schedules and drawings can be maintained and that all recess lighting can be accommodated and shall not interfere with piping, ductwork and the like.
  - .13 Space hangers at maximum 1220mm (4') O.C. along the runner channels and not more than 150mm (6") from the ends to support weight of ceiling and superimposed loads such as lighting fixtures, diffusers and grilles.
  - .14 Where ducts are large or where combination of ducts, or combination of ducts and other items interfere so that hanger spacing exceeds 1220mm (4'), increase size of main runner channels and hangers accordingly to sustain increased loading and span.
  - .15 For fire-resistant rated assemblies, wire tie furring channels to supports.
  - .16 Install suspension systems that are level to within 3mm (1/8") measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.
- .4 Carrying Channels:
- .1 Space carrying channels at maximum 1220mm (4') O.C. and not more than 150mm (6") from boundary walls, interruptions of continuity and changes in direction.
  - .2 Run channels at right angles to structural framing members where splices are necessary, lap members at least 200mm (8") and wire each end with minimum double strand of tie wire. Avoid clustering or lining up splices.
  - .3 Attach channels to rod hangers by bending hanger sharply under bottom of flange of runner and securely wire in place with a saddle tie.
- .5 Cross Furring:
- .1 Erect furring channels at right angles to carrying channels.
  - .2 Space furring channels at 610mm (24") O.C. and not more than 150mm (6") from boundary walls, interruptions in ceiling continuity and change in direction.
  - .3 Secure furring channels to each support with a double strand of tie wire or with clip approved by manufacturer of furring components. Splice joints by nesting and tying channels together.
  - .4 The wallboard furring channels shall be level to a maximum tolerance of 3mm over 3658mm (1/8" over 12') non-cumulative.

### 3.6 GYPSUM WALLBOARD - SINGLE LAYER APPLICATION

- .1 Metal Studs:
- .1 Apply gypsum wallboard with screws. Erect wallboard with long dimension at right angles to supports. For fire rated partitions, erect board vertically or horizontally according to the ULC listing. Locate end joints over supporting members.
  - .2 Locate vertical joints at least 305mm (12") from the jamb/head/sill lines of openings.
  - .3 For parallel application space screws at 200mm (8") O.C. at board edges at 305mm (12") O.C. on board fields.
- .2 Fasteners:
- .1 Perimeter screws shall be not less than 10mm (3/8") from edges and ends and shall be opposite the screws on adjacent boards.
  - .2 Screws shall be driven with a power screw gun and set with countersunk head slightly below the surface of the board.

- .3 Joints:
  - .1 Finish all joints.

### 3.7 FIRE RESISTANT ASSEMBLIES

- .1 Fire resistance rating of gypsum board assemblies and framing shall be as called for on drawings or schedules, and as required to conform with applicable codes and requirements of authorities having jurisdiction.
- .2 Appropriate ULC designs as listed in current ULC list of equipment and materials, Volume II, Building Construction, shall be placed when applicable. Extend partitions full height through ceiling space unless otherwise noted on drawings.
- .3 Vertical bulkheads in ceiling spaces over fire rated glazed partitions, doors and the like shall have same fire rating as the door or partition over which they occur. All such bulkheads shall be of drywall construction unless otherwise noted.
- .4 Use fire rated gypsum board as specified.
- .5 Where lighting fixtures, diffusers, and the like are recessed into fire rated ceilings or bulkheads, provide enclosure to maintain required fire rating. Form removable panel to give access to fixture outlet box.
- .6 Where fire hose cabinets or other fixtures or equipment are recessed in fire rated walls or partitions, provide drywall enclosure or backing to maintain required fire rating, unless otherwise detailed.

### 3.8 CONTROL JOINTS

- .1 Install control joints using metal control joint strip as specified where:
  - .1 A partition, furring or column fireproofing abuts a structural element, dissimilar wall or partition assembly, or other vertical penetration, or ceiling.
  - .2 A ceiling or soffit abuts a structural element, dissimilar wall or partition assembly or other vertical penetrations.
  - .3 Wings of "L", "U" and "T"-shaped ceiling/soffit areas are joined;
  - .4 Construction changes within the plane of the partition or ceiling or soffit.
  - .5 Partition, restrained ceiling or furring run exceeds 9144mm (30').
  - .6 Unrestrained ceiling dimensions exceed 15240mm (50') in either direction.
  - .7 Expansion or control joints occur in the base exterior wall.
  - .8 Wallboard is installed over masonry control joints.
  - .9 And elsewhere as indicated on the drawings.
- .2 Install in accordance with manufacturer's instructions. Where application is on furring members and double furring members at control joints, place one furring member on each side of the control joint.

### 3.9 BULKHEADS

- .1 Fur out bulkheads in areas indicated and as required to conceal mechanical, electrical or other services in rooms where drywall finishes are scheduled, and elsewhere if called for on drawings.
- .2 Ensure hangers are installed as to prevent splaying.

### 3.10 PRESSED STEEL (HOLLOW METAL) FRAMES

- .1 Install pressed steel (hollow metal) frames where they occur in gypsum wallboard partitions.
- .2 Anchor frames securely to studs using a minimum of three (3) anchors per jamb for jambs up to 2134mm (7') high and minimum of four (4) anchors per jamb for jambs over 2134mm (7') high.

### 3.11 ACCESS DOORS

- .1 Access doors supplied by this Section and Divisions 20 and 26 shall be built-in by this Section where required in gypsum wallboard installations, in accordance with manufacturer's recommendations, to match and blend with surrounding surfaces. Refer to drawings for locations.

### 3.12 THERMAL BREAK

- .1 Install self-sticking resilient sponge tape at edges of wallboard in contact with metal windows and exterior door frames to provide a thermal break. Adhere tape to casing bead and compress during installation.

### 3.13 FINISHING

- .1 Before proceeding with installation of finishing materials ensure the following:
  - .1 Wallboard is fastened and held close to framing and furring.
  - .2 Fastening heads in wallboard are slightly below surface in dimple formed by driving tool.
- .2 Levels of Gypsum Wallboard Finish:
  - .1 Level 0: Temporary construction only.
  - .2 Level 1: Plenum areas and above ceilings. Where a fire-resistance rating is required finishing should be in accordance with reports of fire tests of assemblies that have met the requirements of the fire rating imposed.
  - .3 Level 2: Areas of water resistant gypsum backing board under tile, exposed areas where appearance is not critical.
  - .4 Level 3: Service corridors and areas to receive heavy or medium textured coatings or heavy-duty wall coverings.
  - .5 Level 4: Areas to receive light textured coatings or lightweight wall coverings.
  - .6 Level 5: Areas to receive gloss, semi-gloss or flat sheen paints and critical lighting conditions. Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coat over entire surface for corridors, long hallways, walls and ceilings longer than 7500 mm or walls higher than 3600 mm , and for all curved or angled wall surfaces.
- .3 Finish gypsum wallboard in strict accordance with ASTM C840, GA-214 and GA-216 and as follows:
  - .1 Fill and tape joints and internal corners and fill screw depressions in board face and smooth out along corner beads and metal strip with joint compound.
  - .2 Mix joint compound (powder) in accordance with manufacturer's written instructions.
  - .3 Prefill "V" grooves of rounded edges with special setting type joint compound using a 127mm to 150mm (5" to 6") joint finishing knife. Finish flush with tapered surface ready for tape reinforcing application. Allow prefill material to dry thoroughly before application of embedding compound and tape.
  - .4 Apply joint compound in thin uniform layer. Embed reinforcing tape accurately centred on joint and securely pressed in, leaving sufficient compound under tape to provide proper bond. Immediately apply skim coat over tape application. Allow to dry thoroughly before application of next coat.
  - .5 Apply fill coat finishing the tapered depression flush with board surfaces. Allow to dry thoroughly before application of finish coat.
  - .6 Apply finish coat extending slightly beyond the filler coat and feathered out onto the board surface. Do not apply finish coat to gypsum board scheduled to be sprayed with acoustic surfacing finish.

- .7 Sand between coats and following the finishing coat, where necessary, and leave surface smooth and ready for painting.
- .8 Finish screw depressions with filler material and finish coat as specified above.
- .9 Joint and depression finish shall in no case protrude beyond the plane of the board surface.
- .10 Furnish corner beads and metal trim flush with board surface using filler and finishing coats feathered out approximately 50mm (2") and 100mm (4") respectively onto the board surface.
- .11 Provide metal casing beads at exposed edges, at junctions of gypsum/cement board with dissimilar material, at control joints and at junction with columns. Casing beads are required at perimeter of gypsum/cement wallboard ceilings and soffits. Fasten with screws at 305mm (12") O.C. along entire length.
- .12 Finish gypsum board to receive a Level 4 finish.
- .13 Finish all curved gypsum board to receive a Level 5 finish.

### **3.14 REPAIRS**

- .1 After taping and finishing has completed, and before decoration, repair all damaged and defective work, including non-decorated surfaces.
- .2 Patch holes or openings 13mm (1/2") or less in diameter, or equivalent size, with a setting type finishing compound or patching plaster.
- .3 Repair holes or openings over 13mm (1/2"), or equivalent size, with 16mm (5/8") thick gypsum wallboard secured in such a manner as to provide solid substrate equivalent to undamaged surface.
- .4 Tape and refinish scratched, abraded or damaged finished surfaces including cracks and joints in non-decorated surface to provide smoke tight construction, fire protection equivalent to the fire rated construction and STC equivalent to the sound rated construction.

### **3.15 PROTECTION**

- .1 Protect installed products from damage during remainder of construction period.
- .2 Remove and replace panels that are damaged.

**END OF SECTION**



1 General

**1.1 SUMMARY**

- .1 The work in this section includes supply and installation for the following:
  - .1 Ceramic Wall Tile
  - .2 Trims and accessories including edge strips, transition strips, and other accessories required for a complete and finished installation.

**1.2 RELATED REQUIREMENTS**

- .1 Section 05 50 00: Miscellaneous Metals
- .2 Section 06 20 00: Finish Carpentry
- .3 Section 07 92 00: Sealants
- .4 Section 09 90 00: Painting

**1.3 REFERENCE STANDARDS**

- .1 American National Standards Institute/Ceramic Tile Institute (ANSI/CTI):
  - .1 ANSI/CTI A108.1-2011, Specification for the Installation of Ceramic Tile: Collection of 20 ANSI/CTI A108, A118 and A136 Series of Standards on Tile Installation
- .2 American Society for Testing and Materials (ASTM):
  - .1 ASTM C920-11, Standard Specification for Elastomeric Joint Sealants
- .3 Canadian General Standards Board (CGSB):
  - .1 CAN/CGSB-75.1-M88, Tile, Ceramic
- .4 Terrazzo, Tile and Marble Association of Canada (TTMAC):
  - .1 2016/2017 Specification Guide 09 30 00, Tile Installation Manual
  - .2 Hard Surface Maintenance Guide

**1.4 EXAMINATION**

- .1 Examine all areas and conditions affecting work of this Section and report any discrepancies or defects which would affect finished results.

**1.5 SUBMITTALS**

- .1 Submit submittals in accordance with the General Conditions and Section 01 33 00.
- .2 Samples:
  - .1 Submit sample panel of each type and colour tile, 24" x 24". Adhere to a rigid board with setting compound, grout and a dummy control joint showing sealant as specified. Identify samples by project number, date, name of sub-contractor and tile type. Tile and grout used in the building shall correspond to appearance of approved samples in all respects. Do not install tile until samples are approved.
  - .2 Upon Consultant's request submit samples of base, trim and fittings.
- .3 Material Lists:
  - .1 Prior to ordering any materials submit list of products to be used. Products proposed must be recommended by their manufacturer for purpose intended. Upon Consultant's request submit evidence of manufacturer's endorsement.
  - .2 Take care to ensure compatibility of all materials. Consult the manufacturers in case of doubt.

- .3 The supplementary materials shall come from the same production batch as installed materials.
- .4 Safety Data Sheets:
  - .1 Submit WHMIS safety data sheets for inclusion with project record documents. Keep one copy of WHMIS safety data sheets on Site for reference by workers.
- .5 Maintenance Instructions:
  - .1 Upon completion of the Work, furnish Consultant with copies of maintenance instructions, containing complete detailed and specific instructions for maintaining, preserving and keeping clean the surfaces of this Work and in particular, giving adequate warning of maintenance practices of materials detrimental to the work of this Section for inclusion in the Operation and Maintenance Manual.
- .6 Maintenance Materials:
  - .1 Supply 5% extra of each colour of tile and of each tile type for future repairs by the Owner. Place maintenance materials where directed by the Owner and store in their original containers.

#### **1.6 QUALITY ASSURANCE**

- .1 Subcontractor executing work of this Section shall employ installers having a minimum of five (5) years continuous Canadian experience in successful installation of work of type and quality shown and specified. Submit proof of experience upon Consultant's request.
- .2 Work of this Section shall be executed by workers especially trained and experienced in this type of work. Have a full time, senior, qualified representative at the Site to direct the work of this Section at all times. Representative shall meet Consultant's approval.
- .3 Ensure proper use of proprietary materials in strict accordance with the material manufacturer's directions. It shall be the responsibility of the material manufacturer or supplier to furnish these directions to the Contractor and to check periodically at the site to ensure that they are being carried out.

#### **1.7 PRE-INSTALLATION CONFERENCE**

- .1 Contractor shall hold pre-installation conference 2 weeks prior to commencing work of this Section. Conference shall be attended by the Contractor, Owner, Consultant, concrete finishing subcontractor, tile installers and tile manufacturer's representative, setting bed and grout manufacturer's representative to discuss the following, but not limited to the following:
  - .1 Substrate conditions, non-structural cracks, structural cracks and preparation requirements.
  - .2 Wall surface irregularities and levelness tolerances, including all remedial requirements.
  - .3 Installation of tiles and grouting.
  - .4 Edge details and treatments.
  - .5 Installation of tile and grout sealers.
- .2 Contractor shall ensure that manufacturer's representatives issues written installation instructions at the pre-installation conference, to all parties attending the pre-installation conference and the Consultant, for all tile types, setting beds, grouts and sealers required for the work of this Section.
- .3 Contractor shall within 72 hours of the pre-installation conference, prepare minutes of the conference, and issue minutes to all parties attending the pre-installation conference and the Consultant. Contractor shall clearly indicated required actions and by which party.

#### **1.8 DELIVERY, STORAGE, HANDLING AND PROTECTION**

- .1 Co-ordinate deliveries to comply with construction schedule and arrange ahead for off the ground, under cover storage location. Do not load any area beyond the design limits.

- .2 Materials shall be carefully checked, unloaded, stored and handled to prevent damage. Protect materials with suitable non-staining waterproof coverings.
- .3 Store material in original, undamaged containers or wrappings with manufacturer's seals and labels intact.
- .4 Restrict traffic by other trades during installation.
- .5 Provide adequate protection of completed tiled surfaces to prevent damage by other trades until final completion of this project. Minimum protection shall consist of 4 mil polyethylene sheets lapped 4" and taped.

### 1.9 SITE CONDITIONS

- .1 Ambient Conditions: Apply tile after completion of work by other Sections is complete; to surfaces sufficiently dry, clean, firm, level, plumb and free from oil or wax or any other material deleterious to tile adhesion and as follows:
  - .1 Temperature: Maintain tile materials and substrate temperature between TTMAC recommended minimum and maximum temperature range; unless indicated otherwise by manufacturer, for 48 hours before and during installation until materials are fully set and cured; provide additional heat during winter months or at any other time when there is a risk that surface temperatures may drop below minimum recommended temperatures.
  - .2 Ventilation: Maintain adequate ventilation where Work of this Section generates toxic gases or where there is a risk of raising relative humidity to levels that could damage building finishes and assemblies.

### 1.10 WARRANTY

- .1 Warrant the work of this Section against defects in materials and workmanship in accordance with the General Conditions, but for a period of five (5) years, and agree to promptly make good defects which become evident during the warranty period without cost to the Owner. Defects shall include but not be limited to the following; cracking, crazing, discolouration, staining, pitting, splitting and deformation of tiles and grout.

### 2 Products

### 2.1 MATERIALS

- .1 Wall Tiles (CT-1): 100 x 100 mm glazed wall tile; up to 2 colours selected by Consultant from one of the following product lines:
  - .1 Metropolis by Royal Mossa.
  - .2 Bright and Matte Glazed Wall Tile by American Olean.
- .2 Sealants, joint sealants and accessories as specified in Section 07 92 00.
- .3 Trims:
  - .1 Straight Edge Strips: Extruded clear satin anodized aluminum edge strips, 3 mm wide at top edge; height as required to suit tile installation; with integral perforated anchoring leg for setting the strip into the setting material:
    - .1 Basis-of-Design Materials: Schlüter Schiene AE

### 2.2 MORTAR SETTING MATERIALS

- .1 Manufacturers: Mortar and grout materials listed in this Section shall be of a uniform quality for each mortar, and grout component from a single manufacturer and each aggregate from one source or producer as follows:
  - .1 Flextile Ltd.
  - .2 MAPEI Inc.
  - .3 Custom Building Products Ltd.

- .4 Laticrete International Inc.
- .2 Surface Preparation Materials:
  - .1 Levelling Bed/Mortar Additive: Performance standard meeting requirements of ANSI A108.1, Type 2; Acceptable material:
    - .1 Flextile Ltd., Mortar Bed with #43 Additive.
    - .2 MAPEI Inc. Mapecem Premix PL50.
    - .3 Custom Building Products Level Quik Underlayment
    - .4 Laticrete 3701 Fortified Mortar Bed
  - .3 Interior Thin Set Wall System: Dry set mortar meeting or exceeding the requirements of ANSI A108.1 formulated for thin set applications of ceramic biscuit tile, factory sanded mortar consisting of portland cement, sand and additives requiring only potable water to be added for installation:
    - .1 Acceptable mortar materials:
      - .1 Flextile Ltd., #51 Floor and Wall Mix
      - .2 MAPEI Inc. Kerabond
      - .3 Custom Building Products Premium Blend Thinset
      - .4 Laticrete 317 Mortar

### 2.3 GROUT MATERIALS

- .1 Colours will be selected from manufacturer's full range.
- .2 Portland Cement Grout for Wall and Floor Joints  $\leq 1/8$ " Interior Only: factory blended polymer modified mixture meeting requirements of ANSI A108.1:
  - .1 Acceptable Materials:
    - .1 Flextile Ltd., 500 Series Unsanded Grout
    - .2 MAPEI Inc. Ker 800 Unsanded Grout
    - .3 Custom Building Products Polyblend Unsanded Grout
    - .4 Laticrete Peracolor Grout

### 3 Execution

#### 3.1 EXAMINATION

- .1 Maintain minimum temperature of 13 deg C at tile installation area for 24 hours prior to curing and for 24 hours after installation. Do not apply work to frozen surfaces.
- .2 Examine carefully surfaces to which tile is to be installed and report any defects to the Consultant.
- .3 Commencement of installation shall signify complete acceptance of surfaces and conditions.

#### 3.2 PREPARATION

- .1 Surface Preparation:
  - .1 Make backing surfaces level and true to a tolerance in plane of  $\pm 1/8$ " in 8' for walls using levelling bed mortar.
  - .2 Surfaces shall be structurally sound, well fastened, clean and free from dust, oil, grease, paint, tar, wax, curing agents, primers, sealers, form release agents or any deleterious substances that may act as bond barriers.
  - .3 Backing surfaces shall be dry and fully cured. Dampness must not exceed 5% by volume.

- .2 Work of other trades that are required before new tile installation (i.e. electrical conduit installed below ceramic tile) shall be installed, complete and approved before tile installation.

### 3.3 INSTALLATION - GENERAL

- .1 Installation of the tile shall be by thin-set method, as indicated on the drawings and as specified herein.
- .2 Unless otherwise specified, execute tile work according to the latest issue of Specification Guide 09 30 00, Tile Installation Manual - published by Terrazzo, Tile and Marble Association of Canada, as the minimum standard except as varied by this Specification.
- .3 Thoroughly clean surfaces to which tile is to be applied.
- .4 Neatly cut tile around fitments, fixtures, access panels, and the like. Splitting of tile is expressly prohibited except where no alternative is possible. Form intersections, corners and returns accurately.
- .5 Finish surfaces flat and level or, sloped and graded as required.
- .6 Joint Widths: Install tile with the following joint widths, unless indicated on drawings:
  - .1 Wall Tile: 1/16"
  - .2 Make joints consistent width and alignment within tile area.
  - .3 Maintain 2/3 of grout joint depth free of setting material.
- .7 Joints in base shall match floor patterns. Joints shall be watertight without voids, cracks or excess grout.
- .8 Lay out tile so that fields or patterns are centred on wall areas or architectural features and so that no tile less than 1/2 size occurs.
- .9 Arrange and set recessed accessories in tile work so that they are evenly spaced, centred with joints and set true with correct projection. Rigidly install accessories.
- .10 Provide manufacturer's standard trim pieces at changes of direction and at terminations. Unless otherwise indicated provide the following corner and edge conditions:
  - .1 Internal horizontal corners: Coved.
  - .2 External vertical and horizontal corners: Bullnosed.
  - .3 Internal vertical corners and unexposed edges: Square.
- .11 Install tiles in patterns and locations as indicated on drawings.
- .12 Coordinate work of this Section with work of other Sections for items requiring to be recessed into work of this Section.
- .13 Sound tiles after setting and remove and replace tiles not fully bedded.
- .14 Re-point joints after cleaning to eliminate imperfections. Avoid scratching tile surfaces.
- .15 Finished tile work shall be clean and free of tiles which are pitted, chipped, cracked or scratched. All damaged tile shall be removed and replaced.
- .16 Where indicated on Drawings or as required, install continuous single piece metal edge trims where tile meets other finishes.

### 3.4 GROUTING

- .1 Grout tiles in accordance with ANSI A108.10 and as specified herein.
- .2 Mix grouts and install in strict accordance with the manufacturer's instructions.
- .3 Excess grout shall be removed from the surface of tiles using the edge of a rubber float held at a 45 deg angle, moving it diagonally to the joints. Fill all gaps and air holes.

- .4 Do not allow grout to harden on face of tile. Refer to manufacturer's instructions for thorough removal.

### **3.5 CONTROL JOINTS AND SEALING**

- .1 Joints around fixtures, pipes or other fittings shall be sealed with a sealant. Refer to Section 07 92 00 for type of sealants to be used.
  - .1 Colour of sealant shall match grout as selected later by Consultant.

### **3.6 CLEANING AND FINISHING**

- .1 Clean tiled areas after grouting has cured, using compatible solutions and methods as recommended by the manufacturer.
- .2 Remove latex-portland cement 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 written instructions, but no sooner than 10 days after installation.
- .4 Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning.
- .5 Flush surface with clean water before and after cleaning.
- .6 Leave finished installation clean and free of cracked, chipped, broken, unbonded, or other tile deficiencies.

### **3.7 INSTALLATION SCHEDULE**

- .1 Install tile on concrete and masonry walls to TTMAC details 303W.

**END OF SECTION**

1 General

**1.1 SUMMARY**

- .1 This Section includes requirements for supply and installation of ceilings consisting of acoustic panels, complete with exposed suspension system and trim.

**1.2 RELATED REQUIREMENTS**

- .1 Section 09 21 16: Gypsum Wallboard  
.2 Section 09 90 00: Painting

**1.3 REFERENCE STANDARDS**

- .1 American Society for Testing and Materials (ASTM):  
.1 ASTM C635/C635M-13a, Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings  
.2 ASTM C636/C636M-13, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels  
.3 ASTM E1264-14 Standard Classification for Acoustical Ceiling Products  
.2 Underwriters Laboratories of Canada (ULC):  
.1 CAN/ULC S102-10, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies

**1.4 SUBMITTALS**

- .1 Submit submittals in accordance with the General Conditions and Section 01 33 00.  
.2 Action Submittals: Provide the following submittals before starting any work of this Section:  
.1 Product Data: Submit product data for each type of product specified.  
.2 Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling mounted items indicating the following:  
.1 Ceiling suspension system members.  
.2 Method of attaching suspension system hangers to building structure.  
.3 Ceiling mounted items including light fixtures; air outlets and inlets; speakers; sprinklers; and special mouldings at walls, column penetrations, and other junctures of acoustic ceilings with adjoining construction.  
.3 Samples for Initial Selection: Manufacturer's colour charts consisting of sections of acoustic panels, suspension systems, and trim showing the full range of colours, textures, and patterns available for each type of ceiling assembly indicated.  
.4 Samples for Verification: Full size units of each type of ceiling assembly indicated; in sets for each colour, texture, and pattern specified, showing the full range of variations expected in these characteristics:  
.1 6" square samples of each acoustic panel type, pattern, and colour  
.2 Set of 12" long samples of exposed suspension system members, including trim, for each colour and system type required.  
.5 Maintenance and Materials:  
.1 Provide five percent (5%) of each type of acoustic ceiling panels and two percent (2%) of each suspension system and trim for future repairs. Identify cartons and place where directed by the Owner.  
.2 Maintenance materials shall be of same production run as installed materials.

## 1.5 QUALITY ASSURANCE

- .1 The Contractor executing work of this Section shall have a minimum of five (5) years continuous Canadian experience in successful and installation of work of type and quality shown and specified. Submit proof of experience upon Consultant's request.
- .2 Letter of Certification:
  - .1 Contractor together with manufacturer, shall submit a written confirmation, signed by manufacturer's registered professional Engineer, stating that the suspended ceiling system will provide adequate support for electrical fixtures.

## 1.6 DELIVERY, STORAGE, HANDLING AND PROTECTION

- .1 Coordinate deliveries to comply with construction schedule and arrange ahead for off-the-ground, under cover storage location. Do not load any area beyond the design limits.
- .2 Materials shall be carefully checked, unloaded, stored and handled to prevent damage. Protect materials with suitable non-staining waterproof coverings.
- .3 Store material in original, undamaged containers or wrappings with manufacturer's seals and labels intact.

## 1.7 SITE CONDITIONS

- .1 Ambient Conditions: Install acoustic unit ceilings only when building is enclosed, has sufficient heat, when overhead mechanical and electrical work is complete, and dust and moisture producing activities are complete; maintain uniform temperatures and relative humidity within range recommended by material manufacturer from the time of installation until Substantial Performance for the project; make adjustments to temperature and humidity gradually within tolerances indicated by manufacturer.

## 2 Products

### 2.1 MANUFACTURERS

- .1 Acceptable Materials Manufacturers: Subject to compliance with requirements specified in this Section, manufacturers offering products that may be incorporated into the Work include the following:
  - .1 Armstrong World Industries, Inc.
  - .2 Chicago Metallic
  - .3 CertainTeed
  - .4 CGC Interiors, a USG Company

### 2.2 DESIGN CRITERIA

- .1 Superimposed Loads: Determine superimposed loads applied to 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 deflection test.

### 2.3 MATERIALS

- .1 Acoustic Panels (ACT-1): Provide manufacturer's standard panels of configuration indicated in accordance with ASTM E1264 classifications as designated by the nominal values for types, patterns, acoustic ratings, and light reflectance class listed in this Section; with flame spread rating of 25 or less and smoke developed rating of 50 or less when tested in accordance with CAN/ULC S102 and as follows:
  - .1 Physical Properties: Type: IX; Form: 2; Pattern: E; Fire Class: A.
  - .2 Dimensions: 24" x 48" x 3/4".



- .3 Edge Profile: 15/16 Square Lay-In Edge.
  - .4 Colour: White.
  - .5 Acoustic and Visual Performance (Minimum Nominal):
    - .1 Noise Reduction Coefficient (NRC): 0.90
    - .2 Articulation Class (AC): 35
    - .3 Light Reflectance: 180
  - .6 Basis of Design Materials: OPTIMA Lay-In, Model 3151 by Armstrong World Industries, Inc.
  - .2 Metal Suspension System - Acoustical Panel Ceilings: Manufacturer's standard direct hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C635 requirements and as supplied by same materials supplier as acoustic panels for intermediate duty, exposed tee bar and as follows:
    - .1 Tee Bar Grid Face Width: 15/16".
    - .2 Module: Sized as appropriate to acoustic panel size.
    - .3 Hangers, Braces and Ties: Nominal 14 ga. diameter steel wire, galvanized.
    - .4 Exposed Finish: Manufacturer's standard satin, white finish.
    - .5 Corrosion Resistance: Hot-dip galvanized or stainless steel components.
    - .6 Basis of Design Material: 15/16" Prelude by Armstrong World Industries, Inc.
  - .3 Tie Wire:
    - .1 3/64" galvanized soft annealed steel wire.
  - .4 Accessories:
    - .1 Miscellaneous 'U' clips, splicers, screws, anchors, nails, wire, hold-down clips, and the like, for complete installation.
- 3 Execution
- 3.1 INSPECTION**
- .1 Examine the work upon which the work of this Section depends and report any defects to the Consultant. Do not commence installation until such time as all wet trades have been completed. Commencement of work implies acceptance of surface and conditions.
  - .2 Ensure that a uniform minimum temperature of 15 deg. C and humidity of 20 - 40% before, during and after installation is maintained.
- 3.2 INSTALLATION**
- .1 Cooperate with mechanical, electrical, drywall and other trades to accommodate fixtures, and the like. Examine mechanical and electrical drawings to establish hanger layout and ensure that ceiling hanger layout and furring are designed to span ducts, and the like, where required. Supply all hangers, including inserts for hangers and supplementary framing members as required for complete installation.
  - .2 Prior to installation of acoustic panels notify the Consultant for inspection and approval of suspension system.
  - .3 All installations shall be by skilled mechanics and in strict accordance with system manufacturer's printed directions to produce first-class, flush finished surface in true plane, free from drooping, warped, soil or damaged board or grid.

- .4 Accurately space and level all runners and securely wire to main runner channels or hangers as applicable. Join cross tees to main runners by interlocking ends through preformed slots in web of main steel tees. Where joints occur in main tees, they shall be butted together flush and secured with interlocking tack. Tee-to-tee intersections and tee-to-edge mould connections shall be fitted tight, flush and parallel to ceiling plane without twists or gaps. Provide continuous runners each side of light fixtures and frame around all openings.
- .5 Provide all additional supports, hangers and steel trapeze channel framing required to support fixtures located under mechanical ducts.
- .6 Space hangers to support grid on 4'-0" centres each way securely fastened to structure. Hangers shall not, under any circumstances, be secure to pipes, ducts or any electrical or mechanical items.
- .7 Frame around recessed fixtures, grilles and openings with an allowance for movement.
- .8 Grid systems shall be accurately spaced, square, true in line at correct elevations and level with water or laser beam to a tolerance of 1/8" in 12'-0". Grid shall be symmetrically laid so that border panels are not less than half size. Lay out panels square with walls. Obtain Consultant's approval of layout before proceeding.
- .9 The suspension system shall support the ceiling assembly with a maximum deflection of 1/360 of the span.
- .10 Install ceiling suspension system in accordance with ASTM C636 installation procedures.
- .11 Anchors, where required, shall be self-drilling type, installed by means of an electrically powered drill specifically designed for this purpose. The anchor manufacturer shall evaluate the specific job conditions and advise in writing regarding anchor sizes necessary. The safe working load shall not exceed 25% of the manufacturer's stated average test loads for the anchor.
- .12 Receive instruction from the anchor manufacturer regarding correct usage and comply with these requirements.
- .13 "Ramset" or similar powder actuated fastening devices WILL NOT BE PERMITTED.
- .14 Attach hangers to inserts and anchors where structural concrete occurs.
- .15 Hangers shall be looped through the eye bolts of inserts and anchors and around steel joists, securely wire tie the loop of the hanger to the hanger in each case with two strands of tie wire for permanent securement.
- .16 Do not attach hangers to or through steel deck. Attach hangers to steel joist. Where joist spacing is not suitable and where ducts and other equipment interfere, provide cross channels between joists and securely wire tie in position for support of hangers.
- .17 Hangers shall be plumb and not pressed against ducts, pipes or conduits. Splayed hangers are not acceptable. Arrange hangers to cause as little interference as possible to ducts and piping.
- .18 Form hangers tightly and sharply around main runner channels to prevent movement or rotation of the channel within the loop. Securely saddle tie channel to hanger and return loop leg of hanger to the hanger with two strands of tie wire in each case.
- .19 Kinks or bends shall not be made in hangers as a means of levelling main runner channels.
- .20 Assemble ceiling system in accordance with drawings. Install ceilings centered on room axis unless noted otherwise. Lay patterned ceiling panels in one direction with pattern parallel to the shortest room dimension.
- .21 Cooperate with the mechanical contractor and cut ceiling panels as required to accommodate air handling diffuser throughout the work.
- .22 Place panels on flanges of tees. Finish panels to all vertical surfaces with edge mouldings.
- .23 Provide hold-down clips at acoustical system to hold units tight to grid system within 20'-0" of an exterior door and an operable window.

- .24 Provide special cut furring members and access openings of required size to all locations where access to ceiling space is required.
- .25 Install acoustic ceiling panel types as indicated on drawings and schedules.

**3.3 CLEANING**

- .1 Thoroughly clean all acoustic ceiling surfaces upon completion of the installation.
- .2 Promptly as the work proceeds and on completion, remove all surplus materials and debris resulting from the work of this Section.

**END OF SECTION**

1 General

**1.1 SUMMARY**

- .1 This Section includes, but is not limited to, the following:
  - .1 Resilient tile materials:
    - .1 Vinyl composition floor tile for classrooms
  - .2 Resilient accessories:
    - .1 Resilient wall bases
    - .2 Resilient accessories for transition strips, area dividers

**1.2 RELATED REQUIREMENTS**

- .1 Section 03 35 00: Concrete Finishing
- .2 Section 09 30 00: Tiling

**1.3 REFERENCE STANDARDS**

- .1 American Society for Testing and Materials (ASTM):
  - .1 ASTM F1066-04(2014)e1, Standard Specification for Vinyl Composition Floor Tile
  - .2 ASTM F1516-13, Standard Practice for Sealing Seams of Resilient Flooring Products by the Heat Weld Method (when Recommended)
  - .3 ASTM F1861-08(2012)e1, Standard Specification for Resilient Wall Base
  - .4 ASTM F1869-11, Standard Test Method for Measuring Moisture Vapour Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
  - .5 ASTM F1913-04(2010), Standard Specification for Vinyl Sheet Floor Covering Without Backing
  - .6 ASTM F2169-15, Standard Specification for Resilient Stair Treads
- .2 Canadian General Standards Board (CGSB):
  - .1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction

**1.4 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination: Close spaces to traffic during flooring installation and until time period after installation recommended in writing by manufacturer; install flooring and accessories after other finishing operations, including painting and ceiling construction have been completed.
- .2 Pre-Installation Conference: Conduct conference at Project site in accordance with requirements of Section 01 31 19 Project Meetings, to verify project requirements, substrate conditions, patterns and layouts, coordination with other Sections affected by work of this Section, manufacturer's installation instructions and manufacturer's warranty requirements.

**1.5 SUBMITTALS**

- .1 Provide submittals in accordance with the General Conditions and Section 01 33 00 Submittals.
- .2 Action Submittals:
  - .1 Product Data: Submit one copy of product data for each type of product specified.
  - .2 Shop Drawings: Submit shop drawings indicating:
    - .1 Location of seams and edges
    - .2 Location of columns, doorways, enclosing partitions, built-in furniture, cabinets, and cut-out locations

- .3 Type and style of resilient transition strip used between adjacent flooring types
- .3 Samples for Selection: Submit manufacturer's colour charts and samples for initial selection consisting of full range of colours and patterns available for each type of product indicated.
- .4 Samples for Verification:
  - .1 Resilient Flooring: Submit samples of each different specified product for verification of colour and pattern in manufacturer's standard size, but not less than 6" x 6" in size for tile or sheet material, or 6" long for resilient accessories.
- .3 Informational Submittals: Provide the following submittals during the course of the work:
  - .1 Site Quality Control Test Results: Submit results or moisture emission testing of concrete subfloors prior to installation of flooring. Results shall include comparison of manufacturer's recommended moisture content to actual moisture vapour emission rate.
- .4 Maintenance Data and Operating Instructions:
  - .1 Operation and Maintenance Data: Submit manufacturer's written instructions for maintenance and cleaning procedures, include list of manufacturer recommended cleaning and maintenance products, and name of original installer and contact information in accordance with Section 01 77 19 Close Out Requirements.
- .5 Safety Data Sheets:
  - .1 Submit WHMIS safety data sheets for incorporation into the Operation and Maintenance Manual. Keep one copy of WHMIS safety data sheets on site for reference by workers.
- .6 Maintenance Materials:
  - .1 Provide 2% of each colour of vinyl composition tile and 30'-0" lineal feet coil stock of each colour of resilient base specified, boxed and labelled.
  - .2 Store maintenance materials on the premises as directed by the Owner.

## 1.6 QUALITY ASSURANCE

- .1 Contractor executing work of this Section shall have a minimum of five (5) years continuous Canadian experience in successful and installation of work of type and quality shown and specified. Submit proof of experience upon Consultant's request.
- .2 Resilient Flooring Installer: Use an installer who is competent in heat welding and have a minimum of five (5) years documented experience in the installation of resilient sheet flooring and seams in accordance with manufacturer's training or certification program.

## 1.7 DELIVERY, STORAGE, HANDLING AND PROTECTION

- .1 Coordinate deliveries to comply with Construction Schedule and arrange ahead for off-the-ground, under cover storage location. Do not load any area beyond the design limits.
- .2 Materials shall be carefully checked, unloaded, stored and handled to prevent damage. Protect materials with suitable non-staining waterproof coverings.
- .3 Store material in original, undamaged containers or wrappings with manufacturer's seals and labels intact.
- .4 Restrict traffic by other trades during installation.
- .5 Provide adequate protection of completed tiled surfaces to prevent damage by other trades until final completion of this project. Minimum protection shall consist of kraftpaper.

## 1.8 SITE CONDITIONS

- .1 Temperature of room, floor surface and materials shall not be less than 21 deg C for 48 hours before, during and for 48 hours after installation. Concrete floors shall be aged for a minimum of 28 days and shall be dry before application of the resilient floor tile.

- .2 Moisture content of floor shall not exceed a maximum of 3 lbs. of water per 1,000 sq. ft. of concrete slab area over a 24 hour period as measured by one of the following methods, as approved by Consultant:
  - .1 Rubber Manufacturer's Association (RMA) moisture test using anhydrous calcium chloride.
  - .2 Does not exceed 3% as measured by Calcium Carbide Hygrometer procedure.
  - .3 Does not exceed 5% as measured by normal Protimeter.
- .3 Avoid exposure to high humidity, cold drafts and abrupt temperature changes.

## 1.9 WARRANTY

- .1 Warrant the work of this Section against defects in materials and workmanship in accordance with the General Conditions but for an extended period of five (5) years and agree to repair or replace faulty materials or work which become evident during warranty period without cost to the Owner.
- .2 Defects shall include, but not limited to, bond failure, and extensive colour fading.

## 2 Products

### 2.1 MANUFACTURERS

- .1 Basis-of-Design Manufacturers: Manufacturers named in this Section were approved to provide work specified in this Section. Additional manufacturers offering similar products may be incorporated into the work of this Section provided they meet the performance requirements indicated and provided requests for substitution are provided in accordance with Section 01 33 00 Submittals, a minimum of five (5) days in advance of Bid Closing.
- .2 Approved manufacturers:
  - .1 Johnsonite
  - .2 Armstrong Flooring
  - .3 Polyflor

### 2.2 TILE FLOORING MATERIALS

- .1 Vinyl Composition Floor Tile (VCT): Asbestos free uniform in thickness with uniform colour and pattern through the full thickness, with straight, sharp and square edges and corners, accurately cut to size, conforming to ASTM F1066 and the following:
  - .1 Classification: Class 2 – Through Pattern
  - .2 Colour: To match #51899 Cool White.
  - .3 Thickness: 1/8"
  - .4 Size 12" x 12"
  - .5 Basis of Design Material: Standard Excelon Imperial Texture by Armstrong Flooring.

### 2.3 RESILIENT ACCESSORIES

- .1 Resilient Wall Base (RB): Smooth, buffed exposed face and ribbed or grooved bonding surface supplied in maximum practical length, with pre-moulded end stops and external corners to match base, conforming to ASTM F1861 and as follows:
  - .1 Type: TP – Thermoplastic Rubber
  - .2 Group: 1 – Homogeneous
  - .3 Style: B – Cove
  - .4 Height: 4"

- .5 Thickness: 1/8"
- .6 Colour: Black.
- .7 Length: Manufacturers standard maximum length
- .8 Basis of Design Manufacturer: Johnsonite Flooring.
- .2 Resilient Transition and Edge Strips: Extruded vinyl shapes meeting or exceeding ADA Recommendations for change of level transitions for transition between floors finishes having different levels, i.e.: between resilient flooring on underlayment to carpet with no cushion or underlayment; acceptable materials as follows:
  - .1 The following list is included to indicate the most commonly used transition and edge strip accessories; additional materials may be required where transition heights differ from the products listed and shall be included as a part of the Contract.
  - .2 Transition Strip: TS4 – Resilient Flooring to Concrete Slab Transition: Johnsonite SSR-XX-B Transitional Moulding between materials having a thickness to materials having no thickness; colour: selected from manufacturer's standard range.
- .3 Primers, fillers, adhesives: those recommended by flooring manufacturer which will produce good and permanent bond between subfloor and flooring.
  - .1 Resilient Floor Tile Adhesive: Standard Tile: Waterproof, clear setting type and brands as recommended by the tile manufacturer.
- .4 Cementitious underlayment: As indicated in Section 03 35 00 Concrete Finishing.
- .5 Cleaning and finishing materials: as recommended by flooring material manufacturer.
  - .1 Sealer and Wax: Coordinated with Owners preferred long term maintenance program, sealer or wax as appropriate to flooring materials specified.

### 3 Execution

#### 3.1 EXAMINATION

- .1 Surfaces to receive resilient flooring shall be dry, true, even and smooth, and free of paint, grease and oil.
- .2 Perform moisture tests on concrete substrates where moisture content is uncertain. Perform tests in minimum ambient temperature of 18°C. Do not install materials until test results are satisfactory.
- .3 Concrete slabs shall be at least 28 days old before installation of resilient flooring.
- .4 Inspect condition of concrete slabs scheduled to receive resilient flooring as soon as possible after completion and record in writing any deficiencies discovered or state, if no deficiencies are found, acceptance of floor conditions.

#### 3.2 PREPARATION

- .1 Level depressions, cracks and joints in subfloor with non-shrinking type filler compatible with bonding adhesive.
- .2 If recommended by adhesive or tile manufacturer, prime substrates. Apply primer in accordance with manufacturer's directions.

#### 3.3 UNDERLAYMENT

- .1 Where resilient flooring abuts other flooring of different thickness, provide cementitious underlayment allowing for smooth and level transition between finished floor surfaces.
- .2 Mix, apply and finish underlayment in accordance with latex admixture manufacturer's recommendations.

### 3.4 FLOORING INSTALLATION - GENERAL

- .1 Install resilient flooring materials in accordance with material manufacturer's current printed directions. Keep a copy of manufacturer's installation manual on site during execution of work.
- .2 Scribe flooring to walls, columns, cabinets, floor outlets and other appurtenances to produce tight joints. Extend flooring into recesses and closets.
- .3 Locate change to different floor finish or colour centred under doors.
- .4 Provide reducing strip adhesive bonded to floor where floor covering terminates, exposing edge of floor. Install transition strip at junction with other types of flooring.

### 3.5 RESILIENT TILE

- .1 Lay out each area to be tiled symmetrically square with axis of room to provide perimeter tiles at least one half tile in width.
- .2 Distribute tiles having varying shades or pattern evenly over floor area to obtain uniform effect. Abrupt variations will not be permitted. Tile joints shall be flush, uniform, in moderate contact and in straight lines.
- .3 Install tile with joints staggered half tile in one direction and with tile pattern running as directed by the Consultant.
- .4 Immediately after installation, roll entire floor to ensure adhesion in accordance with tile and adhesive manufacturer's recommendations.

### 3.6 RESILIENT BASE

- .1 Adhesive apply cove base to vertical surfaces so that gaps do not occur behind base, so that front lip of base cove bears firmly and uniformly on floor surfaces and so that good and permanent bond is produced between base and surface to which is it applied.
- .2 Use full length pieces where practicable; accumulated short lengths not permitted. Wrap base around outside corners, mitre at inside corners; score back of coved base at outside corners. Use preformed end stops where base end is exposed. Butt joints flush without gaps.

### 3.7 CLEANING

- .1 Cleaning, sealing and finishing of resilient tile flooring shall be performed using the cleaning, sealing and finishing materials specified of one manufacturer in accordance with the manufacturer's instructions and recommendations.
  - .1 Allow a minimum of four (4) days to elapse after completion of each resilient flooring installation before commencing cleaning, sealing, and finishing operations.
- .2 Work shall be handed over to the Owner free of blemishes and in perfect condition.
- .3 Promptly remove adhesive from surface of resilient materials as work progresses.
- .4 Seal and wax floor immediately prior to turnover of building when required by flooring manufacturer. Owner reserves the right to reject resilient floors which show defects after completion of sealing and waxing.

**END OF SECTION**



1 General

**1.1 SUMMARY**

- .1 Provide labour, materials, tools and other equipment, services and supervision required to complete interior painting work.
- .2 Surface preparation for this section will be limited to priming and back-priming, and specific pre-treatments noted in this section or as specified in the Master Painters Institute (MPI) Painting Specification Manual.

**1.2 RELATED REQUIREMENTS**

- .1 Other sections of the specification requiring painting refer to this section. Coordinate requirements of referencing sections.

**1.3 REFERENCE STANDARDS**

- .1 Environmental Choice Paints and Surface Coatings, Low VOC Product Listings Program ([ECP](#)):
  - .1 Paints and Surface Coatings, Low VOC Product Listings
- .2 The Master Painters Institute ([MPI](#)):
  - .1 New Surfaces: Architectural Painting Specification Manual.
  - .2 Existing Surfaces: Interior Maintenance Repainting Manual.
- .3 The Society for Protective Coatings ([SSPC](#)):
  - .1 Coating Materials Guidelines
  - .2 Surface Preparation Guidelines
  - .3 Application, Inspection and Quality Control Guidelines

**1.4 DEFINITIONS**

- .1 Gloss Levels: Standard coating terms defined by MPI Manual apply to products of this Section as follows:
  - .1 G1: Matte or Flat: Lustreless or matte finish with a gloss range below 10 when measured at 85° to meter and 0 to 5 when measured at 60°.
  - .2 G2: Velvet: Matte to low sheen finish with a gloss range of 10 to 35 when measured at 85° to meter and 0 to 10 when measured at 60°.
  - .3 G3: Eggshell: Low sheen finish with a gloss range of 10 to 35 when measured at 85° to meter and 10 to 25 when measured at 60°.
  - .4 G4: Satin: Low to medium sheen with a gloss range of minimum 35 when measured at 85° to meter and 20 to 35 when measured at 60°.
  - .5 G5: Semi-Gloss: Medium sheen finish with a gloss range of 35 to 70 when measured at 60° to meter.
  - .6 G6: Gloss: High sheen finish with a gloss range of 70 to 85 when measured at 60° to meter.
  - .7 G7: High Gloss: Reflective sheen having a gloss range in excess of 85 when measured at 60° to meter.
- .2 Gloss Values: Generally, provide paints and coatings having the following sheens when installed on the following substrates:
  - .1 Walls: Eggshell (G3) or Satin (G4) as selected by Consultant at a later date.
  - .2 Trim and Doors: Semi-gloss (G5).

- .3 Ceilings: Flat (G1).

## 1.5 SUBMITTALS

- .1 Provide required information in accordance with Section 01 33 00.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
  - .1 Product Data: Submit list of all painting materials used for the Work to the Consultant for review prior to ordering materials for each paint system indicated, including block fillers and primers.
    - .1 Material List: An inclusive list of required coating materials indicating each material and cross reference specific coating, finish system, and application; identify each material by manufacturer's catalogue number and general classification.
    - .2 Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.
  - .2 Samples: Provide stepped samples, defining each separate coat, including block fillers and primers using representative colours required for the project; label each sample for location and application, and as follows:
    - .1 Drawdown Samples: Provide three (3) drawdown sample charts (cards) for each type, texture and colour of finish specified for verification purposes before ordering paint materials.
  - .3 Informational Submittals: Provide the following submittals when requested by the Consultant:
    - .1 Certification: Submit certification reports for paint products indicating that they meet or exceed low VOC and coloured base requirements listed in this Section.

## 1.6 PROJECT CLOSEOUT SUBMISSIONS

- .1 Operation and Maintenance Data: Submit copies of paint manufacturer's written maintenance information for inclusion in the operations manual in accordance with Section 01 33 00 – Submittals: Operations and Maintenance Data, including specific warning of any maintenance practice or materials that may damage or disfigure the finished Work.
- .2 Maintenance Materials: Deliver maintenance materials to Owner in quantities indicated and in accordance with Section 01 33 00 Submittals, that match products installed; packaged with protective covering for storage, and identified with labels describing contents and building location and as follows:
  - .1 Paints and Coatings: Minimum of 4-4L containers of field colours and 4-1 L containers of each accent colour, and all remnants.

## 1.7 QUALITY ASSURANCE

- .1 Conform to the standards contained in the MPI Manual.
- .2 Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in service performance, and as follows:
  - .1 Have a minimum of five (5) years proven satisfactory experience and shall show proof before commencement of work that he will maintain a qualified crew of painters throughout the duration of the work.
  - .2 When requested provide a list of the last three comparable jobs including, name and location, specifying authority, start and completion dates and cost amount of the painting work.
  - .3 Apprentices may be employed provided they work under the direct supervision of a qualified journeyman in accordance with trade regulations.

- .3 Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats and as follows:
  - .1 Use only paint manufacturers and products as listed under the Approved Products section of the MPI Manual Architectural Painting Specification Manual.

## 1.8 ENVIRONMENTAL REQUIREMENTS

- .1 Conform to MPI Manual and manufacturers requirements.
- .2 Perform no painting or decorating work when the ambient air and substrate temperatures, relative humidity and dew point and substrate moisture content is below or above requirements for both interior and exterior work.
- .3 Apply paint only to dry, clean, properly cured and adequately prepared surfaces in areas where dust is no longer generated by construction activities such that airborne particles will not affect the quality of finished surfaces.
- .4 Ensure adequate continuous ventilation and sufficient heating and lighting is in place.
- .5 Paint, stain and wood preservative finishes and related materials (thinners, solvents, caulking, empty paint cans, cleaning rags, etc.) shall be regarded as hazardous products. Recycle and dispose of same subject to regulations of applicable authorities having jurisdiction.
- .6 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground retain cleaning water and filter out and properly dispose of sediments.
- .7 Set aside and protect surplus and uncontaminated finish materials not required by the Owner and deliver or arrange collection for verifiable re-use or re-manufacturing.

## 1.9 WARRANTY

- .1 Special Warranty: Provide an MPI two (2) year guaranty, or a 100% two (2) year Maintenance Bond in accordance with MPI Manual requirements; painting subcontractors choosing the Maintenance Bond option must provide a maintenance bond consent from a reputable surety company licensed to do business in Canada as follows:
  - .1 Warrant that painting work has been performed in accordance with MPI Manual requirements.
  - .2 Provide a cash value to repair or replace defective coatings in the event that the original installer is not able to perform warranty work.

## 2 Products

### 2.1 MANUFACTURERS

- .1 Subject to compliance with requirements, manufacturers that have attained the prerequisites for ecologically sustainable labelling mark on their products and may be incorporated into the Work include; but are not limited to, the following:
  - .1 Dulux Paints
  - .2 Sherwin-Williams LLC
  - .3 Benjamin Moore and Co. Limited
  - .4 ICI Paints (Canada) Inc.

### 2.2 MATERIALS

- .1 Primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, and other painting materials shall be in accordance with the MPI Manual "Approved Product" listing and shall be from a single manufacturer for each system used.
- .2 Materials such as linseed oil, shellac, and other accessory materials shall be the highest quality product of an approved manufacturer listed in the MPI Manual and shall be compatible with other coating materials.

- .3 All materials and paints shall be lead and mercury free and shall have low VOC content where possible.
- .4 Colour and Manufacturer: As selected by the Consultant from the manufacturers standard product line. Price for five (5) colours and three (3) accent colours.

### 3 Execution

#### 3.1 PREPARATION OF SURFACES:

- .1 Prepare surfaces in accordance with MPI Manual requirements. Refer to the Manual for specific surface preparation requirements for each substrate material.

#### 3.2 APPLICATION

- .1 Paint when substrates and environmental conditions (heating, ventilation, lighting and completion of other work) are acceptable for applications of products specified in this Section.
- .2 Paint surfaces requiring paint or stain finish to Premium MPI Manual finish requirements with application methods in accordance with best trade practices for type and application of materials used.
- .3 Continue paint finishes through behind wall mounted items.
- .4 Painting coats specified are intended to cover surfaces satisfactorily when applied at proper consistency and in accordance with manufacturer's recommendations.
- .5 Apply a minimum of four coats of paint where deep or bright colours are used to achieve satisfactory results.

#### 3.3 INTERIOR SURFACES

- .1 Paint interior surfaces in accordance with the MPI Manual painting systems listed in this section.
- .2 Concrete Masonry Units (smooth and split face block and brick):
  - .1 INT 4.2A: Latex G3 finish.
- .3 Structural Steel and Metal Fabrications:
  - .1 INT 5.1B: Water based light industrial coating G1 finish.
- .4 Galvanized Metal (doors, frames, railings, misc. steel, pipes, overhead decking, ducts, etcetera):
  - .1 INT 5.3J: Waterborne Primer / Latex G5 finish.
- .5 Plaster and Gypsum Board (gypsum board, drywall, and other sheet gypsum materials):
  - .1 INT 9.2A: Latex (over latex sealer) G3 finish.
- .6 Canvas and Cotton Coverings:
  - .1 INT 10.1A: Latex G1 finish.

#### 3.4 MAINTENANCE REPAINTING

- .1 Paint existing interior previously finishes surfaces, where indicated on the Drawings, in accordance with the MPI Manual painting systems.

#### 3.5 MECHANICAL AND ELECTRICAL EQUIPMENT

- .1 Paint "unfinished" conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and texture to match adjacent surfaces, in the following areas:
  - .1 In exposed-to-view exterior and interior areas.
  - .2 In interior high humidity interior areas.
  - .3 In boiler room, mechanical and electrical rooms.

- .2 Leave conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks in unfinished areas.
- .3 Paint inside of ductwork where visible behind louvers, grilles and diffusers beyond sight line with primer and one coat of matt black (non-reflecting) paint.
- .4 Paint the inside of light valances gloss white.
- .5 Refer to Mechanical and Electrical specifications for painting, banding, stencilling of other surfaces/equipment, and generally as follows:
  - .1 Paint gas piping gas standard yellow where visible in service spaces.
  - .2 Paint both sides and all edges of plywood backboards for equipment before installation.
  - .3 Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.
  - .4 Do not paint over nameplates.

### 3.6 SITE QUALITY CONTROL

- .1 Painted surfaces will be considered to lack uniformity and soundness if any of the following defects are apparent at time of field review when viewed from a distance of 4' from the painted surface:
  - .1 Runs, sags, hiding or shadowing by inefficient application methods
  - .2 Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles
- .2 Painted surfaces will be considered as deficient if any of the following defects are apparent at time of field review, regardless of viewing distance.
  - .1 Damage due to touching before paint is sufficiently dry or any other contributory cause.
  - .2 Damage due to application on moist surfaces or caused by inadequate protection from the weather.
  - .3 Damage or contamination of paint due to windblown contaminants (dust, sand blast materials, salt spray, etcetera)
- .3 Painted surfaces found as unacceptable shall be replaced or repaired at no cost to the Owner or Consultant:
  - .1 Small affected areas may be touched up
  - .2 Large affected areas or areas without sufficient dry film thickness of paint shall be repainted.
  - .3 Runs, sags or damaged paint shall be removed by scraper or by sanding before application of new paint coats.

### 3.7 PROTECTION

- .1 Protect newly painted exterior surfaces from rain and snow, condensation, contamination, dust, salt spray and freezing temperatures until paint coatings are completely dry.
- .2 Curing periods shall exceed the manufacturers recommended minimum time requirements.
- .3 Erect barriers or screens and post signs to warn of or limit or direct traffic away or around work area as required.

### 3.8 CLEANUP

- .1 Remove all paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.
- .2 Keep work area free from an unnecessary accumulation of tools, equipment, surplus materials and debris.

- .3 Remove combustible rubbish materials and empty paint cans each day and safely dispose of it in accordance with requirements of authorities having jurisdiction.
- .4 Clean equipment and dispose of wash water or solvents, and other cleaning and protective materials (rags, drop cloths, masking papers, etcetera), paints, thinners, paint removers and strippers in accordance with the safety requirements of authorities having jurisdiction.

**END OF SECTION**

1 General

**1.1 SUMMARY**

- .1 This Section includes requirements for supply and installation of stone countertops on top of millwork, ready to accept under mount sinks indicated on Mechanical Drawings.

**1.2 RELATED REQUIREMENTS**

- .1 Section 05 50 00: Miscellaneous Metals  
.2 Section 06 10 00: Rough Carpentry  
.3 Section 06 20 00: Finish Carpentry  
.4 Section 07 92 00: Sealants

**1.3 REFERENCE STANDARDS**

- .1 American Society for Testing of Materials (ASTM):  
.1 ASTM C615-03, Standard Specification for Granite Dimension Stone

**1.4 SUBMITTALS**

- .1 Provide product information in accordance with Section 01 33 00.  
.2 Action Submittals: Provide the following samples before starting any work:  
.1 Product Data: Indicate product description, fabrication information, and compliance with specified performance requirements.  
.2 Shop Drawings: Submit shop drawings indicating dimensions, component sizes, fabrication details, attachment provisions and coordination requirements with adjacent work.  
.3 Samples for Initial Selection: Submit minimum 305mm x 305mm (12" x 12") samples. Indicate full colour and pattern variation.  
.4 Consultant recognizes that stone is a natural material, and that variations in tone and hue, and hairline cracks are normal to this material; however, countertops will be rejected at site under the following conditions:  
.1 Finish, texture colour and hue are outside of a reasonable range of variation based on the submitted samples.  
.2 Cracks visible from greater than 915 mm from surface of countertop.  
.3 Project Closeout Submissions:  
.1 Operation and Maintenance Data: Submit manufacturer's care and maintenance data, including repair and cleaning instructions in accordance with Section 01 33 00.

**1.5 QUALITY ASSURANCE**

- .1 Qualifications: Provide proof of qualifications when requested by Consultant:  
.1 Fabricator: Use a fabricator having a minimum of three (3) years experience in fabrication and installation of stone countertops and have training and certification from the manufacturer for work of similar scope and complexity as that required for the project.  
.2 Installer: Install using personnel experienced in installation decorative stone countertops of similar design and complexity as that required for this Project.

## 1.6 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: Deliver components to project when areas are ready for installation.
  - .1 Transport stone countertops with care, securely anchored to pallet, to prevent damage to materials or finishes.
  - .2 Transport stone countertops to the site after completion of adjacent construction that could damage materials of this Section.
- .2 Storage and Handling Requirements:
  - .1 Store stone countertops indoors in an area adjacent to installation.
  - .2 Block off floor.
  - .3 Tilt slightly and secure to prevent fall over.
  - .4 Protect and wrap to prevent abuse, damage or soiling.

## 1.7 SITE CONDITIONS

- .1 Site Measurements: Verify dimensions by site measurements before fabrication and indicate measurements on shop drawings where stone countertops are indicated to fit between or around other construction; coordinate fabrication schedule with construction progress to avoid delaying the Work.
- .2 Established Dimensions: Establish dimensions and proceed with fabricating stone countertops without site measurements where site measurements cannot be made without delaying the Work; coordinate construction to ensure that actual site dimensions correspond to established dimensions; allow for trimming and fitting.

## 2 Products

### 2.1 COUNTERTOP MATERIALS

- .1 Provide Grade 1 stone only; seconds material will not be acceptable, sealed in accordance with manufacturer's standard to prevent staining and discolouration, and as follows:
  - .1 Stone:
    - .1 Quartz: In accordance with ASTM C616; Classification I - Sandstone, selected for architectural finishing.
    - .2 Colour: As selected by the Consultant.
      - .1 Refer to sample provided by Consultant for reference stone, grain, match and colours required for Project.
    - .3 Finish: Satin Polished.
    - .4 Thickness: 19mm (3/4"), unless otherwise indicated on the Drawings.
    - .5 Edge Profile: 38 mm D-Nose.

### 2.2 COUNTERTOP SUPPORT MATERIALS

- .1 Steel Support Framing: Refer to Section 05 50 00, fabricate steel support framing to support weight of stone materials and to account for cut outs and openings required for installation.
- .2 Wood Core: Fabricate countertop core from shop sanded exterior grade veneer core plywood.
- .3 Shims: Fabricator's standard shim materials to fully support stone slab on wood core to provide flat and level installation that does not transfer stresses that could cause cracking in stone slab.
- .4 Fasteners: As recommended by manufacturer and as follows:
  - .1 Draw Bolt Fasteners: Mitre butt joint fastener, adjustable and requiring no special tools for installation, galvanized.



- .2 Non-Exposed Fasteners: Fabricators choice consistent with quality level specified; exposed fasteners will not be permitted.

### 2.3 ACCESSORIES

- .1 Joint Adhesive: Manufacturers recommended adhesive designed to create chemically bonded, inconspicuous, nonporous joints.
- .2 Sealant: Mildew resistant, silicone sealant, as specified in Section 07 92 00. Colour: As selected by the Consultant from the manufacturer's standard product line.
- .3 Stone Sealer: Clear penetrating sealer as recommended by manufacturer having zero Volatile Organic Compounds (VOC).
- .4 Cleaner: Type recommended by manufacturer.

### 2.4 FABRICATION

- .1 Fabricate units to maximum size capable of being safely transported and handled to place of final installation in accordance with shop drawing and manufacturers written instructions using a fabricator certified by the manufacturer.
- .2 Fabricate and machine shapes to profiles indicated on Drawings; obtain all dimensions affecting fabrication and installation from job site before starting fabrication.
- .3 Cut, drill and shape fabrications as required to receive plumbing fittings and services, and built-in accessories, provide edge treatments, back splashes, and other details as indicated on Drawings.
- .4 Finish edges and surfaces true, level and even with inconspicuous joints between having no voids formed using manufactures standard joint adhesive and reinforcing strips.
- .5 Make cut outs with 3mm (1/8") radius corners to prevent stress cracking.
- .6 Fabrication assemblies with tolerances as follows:
  - .1 Variation in component size:  $\pm 3\text{mm}$  (1/8").
  - .2 Location of openings:  $\pm 3\text{mm}$  (1/8") from indicated location.
- .7 Match numbered components assembled on site; number items to show proper location on site; number on back using material that will not show or telegraph through finished assemblies.
- .8 Provide anchorage to receive Work of other Sections scheduled and detailed to be installed.

## 3 Execution

### 3.1 EXAMINATION

- .1 Examine substrates, areas, and conditions where installations of stone countertops occur, with Installer present, for compliance with manufacturers requirements. Verify that substrates and conditions are satisfactory for installation and comply with requirements specified.
  - .1 Carefully inspect the backup structure and millwork to verify that it is ready to accept the work of this Section.
  - .2 Verify all anchors, seats, connections attached to miscellaneous metal supports properly and securely fastened in correct locations.
  - .3 Verify access to point of installation for each stone unit.

### 3.2 INSTALLATION

- .1 Seal stone materials before shipping to site.
- .2 Support stone countertops evenly to prevent stress fractures.
- .3 Apply a thin bead of adhesive to top edges of base cabinet and set stone on top, square to face of cabinet work; cut out openings to match fixtures required and remove from countertops after final set of adhesive.

- .4 Secure and tighten connections with equal torque to prevent stress fractures after stone units are properly aligned, vertically and horizontally with each other and with other related building components.
- .5 Seal joints between countertops and adjacent materials, and between abutting countertops with silicone sealant
- .6 Coordinate electrical requirements with affected Sections of work.

**3.3 CLEANING AND PROTECTION**

- .1 Keep components and hands clean during installation; remove adhesives, sealants and other stains as work progresses; keep components clean until Substantial Performance for the Project.
- .2 Demonstration: Inform Owner of cleaning techniques and required cleansing materials.
- .3 Repair or replace damaged work that cannot be repaired to match installed work at no additional cost to the Owner.
- .4 Protect stone surfaces and corners liable to damage with wood blocking, sacking, or other means, to prevent damage and chipping of installed countertops until Substantial Performance of the Project.

**END OF SECTION**