



**Request for Tender # T-1050-2025
for
Interior Renovation at 140 Commercial
Ave, Ajax**

Appendix D, D-1 and D-2

The Deliverables and Material Disclosures

Tender Document 4 of 4

Electronic submission required

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1 General

1.1 Summary

- .1 The Work of this Section includes, but is not limited to the following:
 - .1 Surety bonds
 - .2 Insurance
 - .3 Warranty security holdback
 - .4 Basis of payment

1.2 Surety bonds

- .1 Provide a performance bond in an amount equal to fifty per cent (50%) of the tendered price for the faithful performance of the Contract, including all obligations during the warranty period. The warranty period will be extended if known deficiencies are incomplete upon expiration of the two (2) year period. In any case, the performance bond shall continue until the final acceptance certificate has been issued by the Owner in accordance with General Conditions.
- .2 Provide a labour and material payment bond in an amount equal to fifty per cent (50%) of the tendered price for the faithful payment of all labour and materials related to this Contract.
- .3 Bonds forms shall be as specified in Appendix B – Supplementary Conditions to CCDC 2-2020.
- .4 Bonds shall not be extended to cover any work beyond the original scope of the Work unless explicitly requested by the Owner. The Contractor shall not be entitled to claim for bonding on such additional work unless such additional bonding is requested by the Owner.
- .5 The Owner accepts that all additional work performed by Change Order is not covered by the bonds. The Owner shall not be entitled to a credit related to the bonds if a change in the Work results in a reduction of the Contract Price.
- .6 Any contract progress reports issued by the Contractor's surety company must be issued directly to the Owner or Consultant at the address provided.

1.3 Insurance

- .1 Provide insurance as required by GC 11.1 of the CCDC 2-2020, as amended by Appendix B – Supplementary Conditions to CCDC 2-2020.

1.4 Warranty security holdback

- .1 A warranty security holdback will be retained progressively, commencing on the first payment certificate, from monies that would otherwise be payable to the Contractor, up to a maximum value of \$10,000.
- .2 The maximum Warranty Security Holdback will be held commencing on the Substantial Performance Payment Certificate.
- .3 The Warranty Security Holdback withheld on progress payments prior to the Substantial Performance Payment Certificate will be based on the percentage of work completed up to the end of the payment period for the respective progress payment.
 - .1 Change Orders will not be considered in the calculation of this “percentage of work completed”.
- .4 The retained amount is strictly to be used as a warranty security and is in addition to the regular holdback and finishing holdback retained in accordance with the Construction Act, the Contractor's performance bond and any monies withheld due to known incomplete and/or deficient work.
- .5 Where Change Orders are issued which increase the final Contract Price, the Owner reserves the right to withhold additional warranty security at the same rate (as is determined by dividing the specified maximum warranty security by the awarded Contract Price) on the value of such additional work. The Owner will notify the Contractor if the Owner intends to invoke this right on any Change Order and payment for any carrying costs on additional warranty security shall be deemed to be included in the respective Change Order.
- .6 Except as otherwise provided hereunder, the warranty security, less any deductions made therefrom as provided for in the Contract, shall be released to the Contractor following the issuance by the Owner of the Final Acceptance Certificate at the end of the warranty period.
- .7 **No substitute form of security will be permitted.**

1.5 Basis of payment

- .1 Payment for bonds and insurance shall be included in the monthly payment certificate after submission of satisfactory documents.
- .2 Payment for all carrying costs associated with the warranty security holdback, including interest thereon, shall be made under this Section on the appropriate line item in the payment certificate. No other compensation for warranty security holdbacks will be considered.
Progress payments will be made as follows:
 - 25% on the first progress payment certificate;
 - 25% on the Substantial Performance Payment Certificate;
 - 50% on the Final Payment Certificate, together with the release of the warranty security holdback at the end of the warranty period, as may be extended in accordance with the Contract.
- .3 The sum of prices bid for bonds, insurance and warranty security holdback carrying costs shall not exceed 2% of the lump sum tendered price.

2 Products – not used

3 Execution – not used

End of section

1 General

1.1 Summary

- .1 This Section specifies requirements for an extension of the Contract warranty period.

1.2 Extension of warranty period

- .1 Provide extension of warranty period for 1 additional year (for a total of 2 years) according to Appendix B – Supplementary Conditions to CCDC 2-2020.

1.3 Basis of payment

- .1 Payment for this Section shall be made on the Substantial Performance Payment Certificate.

2 Products – not used

3 Execution – not used

End of section

1 General

1.1 Work of this project

- .1 Work of the Project, of which Work of this Contract is a part, comprises the following:
 - .1 Minor renovation of the Region's Ajax Social Services office including the removal and replacement of the carpet, new paint, and the demolition and renovation of the men's and women's washrooms at 140 Commercial Ave, Ajax, Units 11, 12 & 14.
 - .2 The materials and/or services shall be delivered FOB Destination(s), Prepaid.

1.2 Contract delivery method

- .1 Perform Work of this Contract under one Contract, by way of an of the Agreement between Owner and Contractor, using the following Contract delivery method:
 - .1 Canadian Standard Construction Document, CCDC 2-2020, Stipulated Price Contract; As amended by Appendix B - Supplementary Conditions to CCDC 2-2020.
- .2 Contract Documents were prepared by the Region of Durham. Any use which a third party makes of the Contract Documents, or any reliance on or decisions to be made based on them, are the responsibility of such third parties.
 - .1 The Owner accepts no responsibility for damages, suffered by any third party as a result of decisions made or actions based in the Contract Documents.

1.3 Work performed under separate contracts

- .1 Work not to be included in the Contract, as noted "NIC" on the Drawings.

1.4 Specifications language, definitions and writing style

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

- .2 Complete sentences by reading "shall", " Contractor shall", "shall be", and similar phrases by inference. Where a colon (:) is used within sentences and phrases, read the words "shall be" by inference.
- .3 Fulfill and perform all indicated requirements whether stated imperatively or otherwise.
- .4 When used in the context of a Product, read the word "provide" to mean "supply and install to result in a complete installation ready for its intended use".
- .5 When used in the context of the Contract Documents, read the word "Contractor" to mean "General Contractor" and/or "Construction Manager", and the word "Subcontractor" to mean "Subcontractor" and/or "Subtrade".
- .6 When used in the context of the Contract Documents, the words "Consultant", "Owner" and "Working Day" are modified by Appendix B – Supplementary Conditions.
- .7 When used in the context of the Contract Documents, read the word "building" to mean "all the buildings included in the Contract".
- .8 When used in the context of 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 Owner in writing unless specifically stated otherwise.
- .9 Wherever in the Contract Documents 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.
- .10 When used in the context of the Contract Documents, read the word "supply" to mean "the work specified to be supplied includes delivery to site and unloading at location directed".
- .11 When used in the context of the Contract Documents, read the word "installed" to 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 the Contract Documents or as directed by the Owner it is specified that work shall be repaired, made good or replaced, it shall be performed without any additional cost to the Owner.
- .13 When used in the context of the Contract Documents, the term "and/or" is used, the Contractor shall decide which of the possible meanings, to be derived at from the sentence where this term occurs shall govern.

1.5 Dimensions

- .1 Do not scale directly from Drawings. Obtain clarification from the Owner if there is ambiguity or lack of information.
- .2 Details and measurements of any Work which is to fit or to conform with Work installed shall be taken at the Place of the Work.
- .3 Verify dimensions at the Place of the Work before commencing Shop Drawings or other submittals. Before fabrication commences report discrepancies to the Owner in writing. Incorporate accepted variances on Shop Drawings and as-built records.
- .4 In areas where equipment is scheduled to be installed, check dimensional data on equipment to ensure that the area and equipment, including future known equipment are compatible with necessary access and clearances provided. Equipment supplied shall be dimensionally suitable for space allocation.
- .5 Verify that the Work is executed in accordance with dimensions and positions indicated which maintain levels and clearances to adjacent Work, as set out in accordance with the requirements of the Contract Documents and ensure that Work installed in error is rectified at Contractor's expense before construction continues.
- .6 Owner will accept no claims for extra expense on the part of the Contractor for non-compliance.

1.6 References

- .1 Refer to and acknowledge other words, terms, and definitions in CCDC 2-2020 Definitions.

1.7 Construction documents for construction purposes

- .1 The Owner will supply Contractor with a complete set of Contract Documents in electronic form before commencement of the Work. Contractor may print hard copies for construction purposes as required.
- .2 Drawings, Specifications, and schedules are complementary each to the other and what is called for by one to be binding as if called for by all. Should any discrepancy appear between documents which leave doubt as to the intent or meaning, abide by Precedence of Documents article below or obtain direction from the Owner.
- .3 Drawings indicate general location and route of conduit and wire/conductors. Install conduit or wiring/conductors and plumbing piping not shown or indicated diagrammatically in schematic or riser diagrams to provide an operational assembly or system.
- .4 Install components to physically conserve headroom, to minimize furring spaces, or obstructions.
- .5 Locate devices with primary regard for convenience of operation and usage.
- .6 Examine all discipline Drawings, Specifications, and schedules and related Work to ensure that Work can be satisfactorily executed. Conflicts or additional work beyond work described to be brought to attention of Owner.

1.8 Division of the Work

- .1 Division of the Work among Subcontractors, Suppliers and vendors is solely the Contractor's responsibility. The Owner does not assume any responsibility to act as an arbiter to establish subcontract terms between sectors or disciplines of work.
- .2 Refer to the Contract Documents for the required Work.
- .3 Division 01 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 their Subcontractors by their separate agreements.

- .4 Ensure that Subcontractors understand that the General Conditions of the Contract as amended by the Supplementary Conditions, and Division 01 General Requirements, apply to Sections of the Specification governing their work.
- .5 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.
- .6 The Work also includes the examination of the site, submission of samples, scheduling and coordination, project meetings, protection of the existing facility, repair and preparation of surfaces, quality control, inspection reports, project cleanliness, maintenance of data, preparation of as-built drawings, final cleaning and warranty.

1.9 Construction schedule

- .1 Refer to Appendix B – Supplementary Conditions to CCDC 2-2020; Article A-1 – The Work, for the following milestone dates:
 - .1 Number of weeks required to attain Ready-for-Takeover milestone;
 - .2 Number of weeks required to attain completion.

1.10 Coordination with other disciplines work

- .1 Coordination of the installation of systems specified by Mechanical and Electrical Engineers, including the interrelating operation and functioning between components of a system and between systems, is the responsibility of those performing the work, with final coordination the responsibility of the Contractor.
- .2 Provide interference drawings as herein specified to ensure proper coordination 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 Owner before commencing installation.

1.11 Discrepancies and clarifications

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

1.12 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.

1.13 Documents at the site

- .1 Keep the following documents at Place of the Work, stored securely and in good order and available to Owner in electronic form (Hard copy forms are an acceptable equivalent to electronic forms):
 - .1 Current Contract Documents, including Drawings, Specifications, and Addenda;
 - .2 Change Orders, Change Directives, and Supplementary Instructions;
 - .3 Reviewed Shop Drawings, product data and samples;
 - .4 Field test reports and records;
 - .5 Construction progress schedule;
 - .6 Meeting minutes;

- .7 Manufacturer's certifications;
- .8 Permits, inspection certificates, and other documents required by authorities having jurisdiction;
- .9 Contractor's health and safety policy;
- .10 Ministry of Labour Notice of Project;
- .11 Building permit;
- .12 Current as-built drawings;
- .13 Safety Data Sheets (SDS) for all controlled Products.

1.14 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 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.
- .5 Maintain good order and discipline among workers engaged on the project.

1.15 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 Owner.

1.16 Work by Owner

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

1.17 Items supplied by Owner

- .1 Salvage and reuse all site furnishings and fixtures which are identified to be relocated on the site. The Owner shall approve condition of all salvaged site furnishings and fixtures.

1.18 Existing equipment

- .1 The General Contractor will be responsible for moving all existing furniture and equipment prior to start of each phase of construction.

1.19 Basis of payment

- .1 **There shall be no payment for this Section as no actual Work is specified herein.**
- .2 All payment for the Work of the Contract shall be included, properly balanced, in other Sections in Appendix C – Pricing Form as agreed by the Owner prior to commencing the Work.

1.20 Qualifications of Contractor

- .1 The Contractor for this Contract shall have the following experience:
 - .1 Substantially performed at least three (3) projects of similar and related scope, as indicated in the Contract Documents, in the past five (5) years.
 - .2 Acted in the role of Contractor on two of the three referenced projects.

2 Products – not used

3 Execution – not used

End of section

1 General

1.1 Summary

- .1 The Work of this Section includes, but is not limited to the following:
 - .1 Administrative and procedural requirements for portions of the Work the design of which is delegated to the Contractor.

1.2 References

- .1 Definitions:
 - .1 Delegated: Means transferred by the Owner to the Contractor.
 - .2 Design: Means the complete planning, arrangement, and coordination of a discrete portion of the work, along with its graphic and written communication, including determination and engineering of the item's organization and structure in response to aesthetic requirements, functional requirements, dimensional and geometric limits, and the arrangement, performance, and other criteria indicated in the Contract Documents.
 - .3 Engineering services: Means structural engineering services performed for the design, fabrication, and installation of systems, assemblies, and components similar in material, design, complexity and extent to that indicated for this Project.

1.3 Administrative requirements

- .1 Portions of the Contract Documents may delegate the design of certain items to the Contractor or may otherwise specify "delegated design requirements" in individual Specification Sections.
- .2 The Contractor is professionally liable for delegated design work, including design, engineering, and conformance to specified performance requirements.
- .3 Drawings of delegated design portions of Work are diagrammatic; they do not identify or imply solutions to engineering issues, and are intended to only show:
 - .1 The design intent of finished materials, profiles, shapes and forms;

- .2 Relationships between items;
- .3 Location, identification, dimension and size of components, assemblies, accessories, and other items; and
- .4 Schematic attachment details and diagrams of fasteners and connections.
- .4 Specifications for delegated design portions of the Work are the performance type, and establish the minimum criteria for materials, fabrications, products, systems, assemblies, and methods of execution, along with the minimum performance requirements for indicated portions of the Work.
- .5 The Owner reviews and determines whether or not the Contractor's designs:
 - .1 Conform to the overall project design;
 - .2 Conform to the specified performance requirements, including subsequent modifications; and
 - .3 Are appropriately integrated into the overall design of the project.
- .6 In the event of a dispute regarding the Contractor's proposed delegated design solutions and the design intent of the Contract Documents, the decision of the Owner is final.

1.4 Procedural requirements

- .1 Design requirements: Proposed delegated design solutions must demonstrate conformance to the original design intent of the Contract Documents, as determined by the Owner.
 - .1 Unless otherwise defined by the Contract Documents, the appearance of exposed elements, including member sizes, profiles, and alignment of components must be:
 - .1 Within the dimensional limits and section profiles indicated; and
 - .2 Consistent throughout the Project.
 - .2 Deviation from the profiles, layouts, dimensional locations, or arrangements indicated is not permitted without prior written consent from the Owner.

- .3 Contractor-proposed delegated design solutions that exactly follow the details indicated on the Drawings do not relieve the Contractor from liability for the design and performance of the delegated design portions of the Work.
- .2 Engineering requirements: Engineer delegated design portions of the Work:
 - .1 Will meet or exceed the specified performance criteria;
 - .2 Will conform to the profiles indicated and to other requirements of the Contract Documents;
 - .3 Will satisfy the requirements of the authorities having jurisdiction; and;
 - .4 Will provide structurally sound, leak-proof, non-corroding, and weather tight assemblies, as applicable, that accommodate, resist, distribute, or transfer, as applicable, the minimum specified in-service loads, and thermal, seismic, and wind sway, or other types of movement, without incipient or catastrophic failure.
- .3 Regulatory requirements: Delegated design items must be engineered in conformance with the latest edition of the OBC.

1.5 Submittals

- .1 General: Coordinate and process submittals for delegated design portions of Work in same manner as for other portions of Work.
- .2 Professional Engineer's qualifications:
 - .1 In all cases where delegated design services are specified to be performed under the Contract or where Work is specified to be performed by a "Professional Engineer" or "Engineer", including but not limited to sealed shop drawings and quality verification services.
 - .2 The person providing such Work shall be a Professional Engineer, licensed by in the Province of the Work, providing such services under a certificate of authorization issued by the PEO and who carries errors and omissions (professional liability) insurance coverage.

- .3 Design data: Submit structural engineering calculations demonstrating conformance to the requirements of the Contract Documents and of the authorities having jurisdiction.
 - .1 Calculations must be legible and incorporate sufficient cross-references to shop drawings to make calculations readily understandable and reviewable.
 - .2 At a minimum, structural calculations must contain:
 - .1 An analysis of framing members;
 - .2 Section property computations for framing members;
 - .3 An analysis of anchors, including anchors embedded in concrete; and
 - .4 The signature and seal of the Professional Structural Engineer, licensed in the Province of the Work, and responsible for their preparation.
 - .3 Test reports are not an acceptable substitute for calculations.

1.6 Quality assurance

- .1 Professional Structural Engineer's qualifications: Must be legally qualified to practice in the Province of the Work, with five (5) consecutive years' experience providing engineering services for projects similar in material, design, complexity, and extent to this Project.

2 Products

2.1 Materials

- .1 Provide materials, fabrications, products, components, and accessories required for a complete design, whether or not such items are indicated on the Drawings or in the Specifications.
- .2 Provide anchors, attachments, inserts, fasteners, clips, bracing, framework, and similar items as required to meet specified design and performance requirements, and to securely attach delegated design Work to adjacent supports, or to related adjoining work, whether or not such items are indicated on the Drawings or in the Specifications.

3 Execution

3.1 Design

- .1 Unless otherwise indicated or specified, maintain the design intent and conform to the performance requirements indicated on the Drawings and in the Specifications, as determined by the Owner.
 - .1 In the interest of certain fabrication or erection methods, minor dimensional changes and detailing adjustments to the original design communicated in the Contract Documents may become necessary.
 - .2 Obtain written approval from the Owner for proposed changes and adjustments before procurement, fabrication, manufacture, assembly, or installation, as applicable.
- .2 Engage a qualified professional structural engineer to design connection details and determine fastener types and sizes.
 - .1 Fasteners or connections may neither conflict with nor require revision to the finish profiles indicated or the supporting work.
 - .2 Connections may not impose eccentric loading, nor induce twisting or warping to the supporting structure.
 - .3 Connections must be designed to accommodate potential and actual misalignment of adjacent work within tolerances specified in other Sections.

3.2 Delegated design schedule

- .1 Section 05 50 00 Metal Fabrications; For non-ornamental metal fabrications for solid surface counter bracing.

End of section

1 General

1.1 Summary

- .1 The Work of this Section includes, but is not limited to the following:
 - .1 Restrictions on use of premises
 - .2 Work sequence
 - .3 Owner occupancy of spaces outside of this Contract
 - .4 Partial owner occupancy of spaces under this Contract
 - .5 Interruption of existing services / utilities
 - .6 Site access by the Contractor
 - .7 Working hours
 - .8 Restricted hours of Work – Special requirements
 - .9 Contact for after-hours or emergency services
 - .10 Maintaining life safety systems in occupied facilities
 - .11 Cold weather construction
 - .12 Security and protection of construction site and equipment
 - .13 Police record check / non-disclosure agreement (NDA)

1.2 Restrictions on use of premises

- .1 Limit use of premises for Work and storage required to complete the Project, and to allow the following:
 - .1 Partial Owner occupancy.
 - .2 Public usage.
- .2 Coordinate use of premises under direction of the .

1.3 Work sequence

- .1 Schedule and construct Work in stages to accommodate Owner's continued use of premises during construction.
- .2 Schedule and construct Work in stages to provide for continuous public usage. Do not close off public usage of facilities until use of one stage of Work will provide alternate usage.
- .3 Required stages:

- .1 Refer to phasing diagrams.
- .2 Phase 1: Replace carpet, new paint and renovate the women's washroom.
- .3 Phase 2: Replace carpet, new paint and renovate the men's washroom. Phase 2 will not commence until the work in Phase 1 is complete.
- .4 Phase 3: Replace carpet and new paint. Phase 3 will not commence until the work in Phase 2 is complete.

1.4 Owner occupancy of spaces outside of this Contract

- .1 The building and parking areas, which are not immediately affected by the Work, will remain occupied by the Owner during the Work. Cooperate with Owner in scheduling operations to minimize disruptions and to facilitate Owner usage.
- .2 Maintain continuation of fire protection in existing building.
- .3 Maintain existing exits and ensure that proper and safe means of egress from all parts of existing building to open spaces are provided at all times to the approval of authorities having jurisdiction. Locate and install exit lights, and illuminate temporary means of egress, where required.
- .4 Maintain access to service and delivery entrances.
- .5 Maintain security of existing building during the Work.

1.5 Partial owner occupancy of spaces under this Contract

- .1 Schedule designated portions of Work for Owner's use prior to Ready-for-Takeover.

1.6 Interruption of existing services / utilities

- .1 Notify Owner and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Owner a minimum forty-eight (48) hours of notice for necessary interruption of mechanical or electrical service throughout course of work.
- .3 Keep duration of interruptions minimum. In no case shall service interruptions affect the total existing building.

- .4 Do not interrupt mechanical or electrical services of the existing building except for temporary close-downs to make connections to new work, and as approved by prior arrangements.
- .5 Carry out interruptions after regular working hours of occupants, preferably on weekends, unless Owner's prior written approval is obtained.
- .6 Protect and maintain existing active services. Record location of services, including depth, on as-built drawings. Have all utilities located and staked out and provide the Owner with all cable locations supplied by the utilities prior to commencing any excavation or demolition.
- .7 Contact the local municipality, utilities or any other agencies for further information regarding the exact location of all existing utilities, to exercise the necessary care in excavation and demolition operations, and to take such precautions necessary to safeguard the utilities from damage.
- .8 Arrange with mechanical and electrical Subcontractors to immediately cut off and cap decommissioned services, previously concealed but uncovered during work.
- .9 All utilities located within the limits of proposed excavations shall be exposed by hand excavation and carefully supported and protected by the Contractor.
- .10 Removal, relocation, or supporting of existing utilities shall be carried out in consultation with the respective authorities:
 - .1 Elexicon
 - .2 Bell Canada
 - .3 Enbridge Gas
 - .4 Rogers Cable
 - .5 any other utility/Contractor as required.
- .11 Should existing services be accidentally uncovered and disrupted, make complete restoration immediately, and ensure adequate protection to avoid further disruption until alternative means of providing permanent continuation of the services are made.

- .1 Make restorations to uncovered or disrupted mechanical or electrical services where such services pose a potential health or safety risk.
- .2 Restorations shall be an extra to the Contract only where such work could not have been reasonably foreseen by examination at the time of bidding in the sole opinion of the Owner.
- .12 Be responsible for paying charges by the Utilities or Agencies for locating cables and pay any charges for repairs and lost revenue if utility equipment, cables, pipes or other assets are damaged and is responsible to make good any ground and surface damages as well.
- .13 Make payment for work specified in the foregoing at no additional cost to the Owner if, in the opinion of the Owner, such work could have been reasonably foreseen by examination at time of bidding and which has been caused by lack of proper care and protection.
- .14 Prior to the commencement of demolition, provide a sign-off sheet from the existing water, gas, electrical, telephone, and sewer service providers.
- .15 Verify that services are cut off, capped, diverted and/or removed as required by local regulating authorities. Ensure all services are in the proper state prior to commencing work.
- .16 Ensure all utilities are capped off at the property line and identify the termination locations on reference drawings.
- .17 Unless otherwise specified, restore services on which work is performed to original condition.
- .18 No claims will be considered which are based on delays or inconvenience resulting from the removal or relocation of services not being completed before the start of this Contract.

1.7 Site access by Contractor

- .1 Unless stated otherwise, the Contractor will be permitted access to the site from start of construction until Substantial Performance of the Contract.
- .2 Access Roads and Walks:

- .1 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.
- .3 After Substantial Performance of the Contract, the Contractor shall not enter the facility without prior written authorization from the Owner and the Contractor's activities shall be restricted to the work duly authorized by the Owner, including modifications and rectification of deficiencies. If the Contractor proposes to perform additional work other than the authorized work, further written approval must be obtained by the Contractor from the Owner prior to proceeding with such additional work.
- .4 Workers employed on the site shall sign a "Daily Register" provided showing "IN" and "OUT" times and number of hours worked on each shift. Times shall be recorded in 24-hour time (i.e. 00:00 to 23:59).
- .5 All Contractor's workers employed on site shall be orientated by the facility operator prior to start of work.

1.8 Working hours

- .1 Carry out Work between the hours of 6:00 a.m. and 5:00 p.m. local time, Monday through Friday except statutory holidays.
- .2 If the Contractor wishes to complete any work outside of these regular hours, obtain permission from the facility operator through the Owner at least forty-eight (48) hours prior.
- .3 The Owner will not be responsible for additional costs associated with working after regular hours unless such after-hours work is ordered by the Owner and not specified as a requirement in the Contract Documents.
- .4 The Owner will not be responsible for additional costs associated with working after regular hours if such after-hours work is required for the Contractor to return to the agreed upon construction schedule.

1.9 Restricted hours of work – Special requirements

- .1 Perform "odour-generating work" at Owner-occupied areas:
 - .1 From Monday to Friday from 5:00 p.m. to 6:00 a.m. only.
 - .2 On Saturdays, Sundays, and statutory holidays to Owner approval.

- .2 Schedule "excessively noisy work" to avoid disturbance to building occupants, as follows:
 - .1 Monday to Friday from 5:00 p.m. to 6:00 a.m.
 - .2 On Saturdays, Sundays, and statutory holidays to Owner approval.
- .3 Major noise emitting activities shall include activities that generate noise levels above those normally generated by construction activities, such as pile driving, demolition, and the like.
- .4 Notify owners and representatives of occupied buildings adjacent to the Place of the Work, as well as the Owner, a minimum of 48 hours prior to undertaking major noise emitting activities, including a description of the nature and extent of such activities. Owner shall provide contact information for representatives of adjacent occupied buildings to the Contractor.
- .5 Owner has the right to request immediate cessation of noise or vibration generating activities where occupant safety is in immediate jeopardy.
- .6 Use power actuated devices only with 's written permission.
- .7 Submit schedule of special requirements or disruptions in accordance with Section 01 33 00.

1.10 Contact for after-hours or emergency services

- .1 When after-hours work is permitted by the Owner, provide an after-hours phone number to respond to emergencies or requirements that arise when offices are closed.

1.11 Maintaining life safety systems in occupied facilities

- .1 Maintain operational life safety systems and public access to exits in occupied areas during all stages of the Work.
- .2 Determine nature and exact locations of existing fire and smoke sensors prior to the commencement of the Work. Avoid direct or indirect jarring while working in adjacent areas and exercise caution to avoid triggering these devices.
- .3 Be responsible for costs incurred by Owner on account of false fire alarms activated as a result of the execution of the Work without adequate precautions.

1.12 Security and protection of construction site and equipment

- .1 Protect the construction site and equipment from damage. Repair any damage to the construction site or equipment to the satisfaction of the Owner.
- .2 Take precautions to protect the site and equipment until Completion.
- .3 The Owner shall not be responsible for damaged, lost or stolen materials and equipment. Contractor is responsible for all materials and equipment left on site until the work is complete. Provide for proper security or storage of any material or equipment left on site.
- .4 When not at the Place of the Work, ensure that the work area is secured, and that all tools and materials are locked up.

1.13 Police record check / non-disclosure agreement (NDA)

- .1 Due to the nature of business in the subject Regional Facilities and information that may be provided to the Contractor, the Contractor and all their staff assigned to do the Work shall be subject to a Criminal Record and Judicial Matters Check and a Non-Disclosure Agreement (NDA) in accordance with paragraph .2 of this article. The Contractor shall be responsible for all costs associated with having the Police Record Checks completed.
- .2 The Contractor's and all Subcontractors' personnel will be required to provide a Criminal Record and Judicial Matters Check, from a suitable police jurisdiction confirming they do not have a record of criminal activity and/or a signed Non-Disclosure Agreement (NDA). This shall be provided immediately after the Contract award, or upon any proposed change of the Contractor's or Subcontractor's personnel during the Contract.
- .3 The Owner reserves the right to not accept any personnel proposed by the Contractor or their Subcontractor(s) where the specified Criminal Record and Judicial Matters Check has revealed any record of criminal activity or behaviour, has revealed charges pending, or has been deemed unacceptable by the Owner based on any information revealed.
 - .1 If any individual is deemed unacceptable to perform services under this Section, the Owner shall notify the Contractor to immediately remove the individual from the Contract and replace with another

suitably qualified individual within a reasonable period of time, subject to furnishing an acceptable Criminal Record and Judicial Matters Check for the proposed substitute person in accordance with this Section.

- .2 Failure to remove the individual as directed by the Owner shall constitute a default by the Contractor.
- .4 The Owner reserves the right to not accept any personnel proposed by the Contractor or its Subcontractor(s) where a signed NDA form has been requested but not provided.

2 Products – not used

3 Execution – not used

End of section

1 General

1.1 Summary

- .1 The Work of this Section includes, but is not limited to the following:
 - .1 Substitution procedures
 - .2 Submission requirements for proposed substitutions
 - .3 Incorporation of specified Products

1.2 Definition

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

1.3 Substitution procedures

- .1 Contractor may propose a substitution wherever a Product or manufacturer is specified by proprietary name(s), unless there is accompanying language indicating that substitutions will not be considered.
- .2 Contractor may propose a substitution wherever a Product or manufacturer is specified by proprietary name(s) and accompanied by language such as “or approved equivalent”, or other similar words. Do not construe such language as an invitation to unilaterally provide a substitution without Owner’s prior acceptance in writing. Do not order or install any substitution without a Supplemental Instruction or Change Order.
- .3 Provided a proposed substitution submission includes all of the information specified in this Section under submission requirements for proposed substitutions, Owner will promptly review and accept or reject the proposed substitution.
- .4 Owner may accept a substitution if satisfied that:
 - .1 The proposed substitute Product is the same type as, is capable of performing the same functions as, interfaces with adjacent work the same as, and meets or exceeds the standard of quality,

- performance and, if applicable, appearance and maintenance considerations, of the specified Product;
- .2 The proposed substitute manufacturer has capabilities comparable to the specified manufacturer, and;
 - .3 The substitution provides a benefit to Owner.
- .5 If Contractor fails to order a specified Product or order a Product by a specified manufacturer in adequate time to meet Contractor's construction schedule, Owner will not consider that a valid reason to accept a substitution.
- .6 If Owner accepts a substitution and subject to Owner's agreement, the change in the Work will be documented in the form of either a Supplemental Instruction or Change Order.
- .1 The approval or rejection of a proposed substitution shall be at the discretion of the Owner whose decision shall be final. The Owner reserves the right to assess to the Contractor all costs of the Owner related to their review of the proposed substitution.
 - .2 The Contractor's Tendered Price shall be based on the Products specified. No tender shall be based on a presumed acceptance by the Owner of a substitute Product.
- .7 If a substitution is accepted in the form of a Supplemental Instruction or Change Order, Contractor shall not revert to an originally specified Product or manufacturer without Owner's prior written acceptance.
- .8 The Contractor shall assume all responsibility for liabilities and additional costs that may subsequently arise as a result of their proposed substitution being accepted by the Owner.
- .9 Any design or construction changes necessitated by the use of substituted Products shall be at the expense of the Contractor. The Contractor shall be responsible for assuring the proper fit and matching of all substituted Products to the surrounding pipe, equipment or materials.
- .10 Owner is under no obligation to accept proposed substitute Products unless the Contractor can provide evidence satisfactory to the Owner that

such proposed substitute Product meets or exceeds the specified performance and other criteria.

1.4 Submission requirements for proposed substitutions

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

1.5 Incorporation of specified Products

- .1 Coordinate the installation of the selected Products into the Work:
 - .1 Make any changes in the Work as may be required to accommodate the selected Products.
 - .2 Notify Owner where a selected Product is inconsistent with the layouts and configurations indicated on Drawings and Schedules.
 - .3 Bear costs and waive claims for additional compensation for costs that are implicit in the use of the selected Products.

2 Products – not used

3 Execution – not used

End of section

1 General

1.1 Summary

- .1 The Work of this Section includes, but is not limited to the following:
 - .1 Schedule of Labour Rates
 - .2 Requests for Interpretation (RFIs)
 - .3 Supplemental Instructions
 - .4 Method of Contract Price Adjustment - Change Orders
 - .5 Method of Contract Price Adjustment - Change Directive

1.2 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 Contractors' standard RFI on "Request for Interpretation" form. The Owner shall not respond to an RFI except as submitted on an RFI 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 Owner, 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 Owner.

- .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 Owner shall review RFIs from the Contractor submitted in accordance with this Section, with the following understandings:
 - .1 Owner'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 Owner shall respond to RFIs. Responses to RFIs received from entities other than the Owner shall not be considered.
- .9 Allow five (5) Working Days for review of each RFI by the Owner.
 - .1 Owner's review of RFI commences on date of receipt by the Owner of RFI submittal and extends to date RFI returned by Owner.
 - .2 When the RFI submittal is received by Owner before noon, review period commences that day; when RFI submittal is received by Owner 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.
- .11 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 Owner, insufficient, shall not be reviewed by the Owner and shall be rejected.

1.3 Supplemental Instructions

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

1.4 Method of Contract Price adjustment - Change Orders

- .1 Unless otherwise agreed, the adjustment of the Contract Price on account of a proposed change in the Work shall be based on a quotation for a price increase or decrease to the Contract Price regardless of the Contractor's actual expenditures and savings.
- .2 For procedures and fees associated with Change Orders, refer to GC 6.2 Change Order within CCDC 2-2020 and Appendix B - Supplementary Conditions.

1.5 Method of Contract Price adjustment - Change Directives

- .1 Unless the Owner and the Contractor reach an earlier agreement on the adjustment to the Contract Price by means of a Change Order that cancels the Change Directive, the adjustment in the Contract Price for change carried out by way of a Change Directive shall be determined as specified in GC 6.3 Change Directive within CCDC 2-2020 and Appendix B - Supplementary Conditions.

2 Products – not used

3 Execution – not used

End of section

1 General

1.1 Summary

- .1 The Work of this Section includes, but is not limited to the following:
 - .1 Construction act holdback
 - .2 Submission of proper invoices for payment
 - .3 Workers' compensation clearance
 - .4 Statutory declarations
 - .5 Payment for products stored off site

1.2 Construction act holdback

- .1 In accordance with the Construction Act, a 10% holdback will be deducted from each progress payment.
- .2 The Owner shall have the right to withhold the 10% Construction Act regular and finishing holdbacks until the Owner is in receipt of the submissions specified in Section 01 33 00, for submissions at Substantial Performance of the Work and submissions at completion, as applicable.

1.3 Submission of proper invoices for payment

- .1 In accordance with Appendix B – Supplementary Conditions, applications for payment shall be preceded by a payment review meeting to be held no less than five (5) Working Days before the end of the monthly payment period.
- .2 In accordance with Appendix B – Supplementary Conditions, email draft invoices to the Consultant and the Owner at least one (1) Working Day prior to the scheduled monthly payment review meeting.
- .3 At the payment review meeting, review with Owner and Consultant the Contractor's draft invoice, status of Change Orders and Change Directives, holdbacks and net amount due for that billing period.
- .4 Consultant and Owner will provide a marked-up copy of the Contractor's draft invoice within five (5) Working Days of the payment review meeting.

- .5 **Submit Proper Invoice by email to the Owner's Project Manager, Mr. Andrew MacIntosh and the Contract Services Coordinator, Ms. Kelly Vecchiarelli** for processing no earlier than five (5) Working Days after the end of the billing period. **Do not mail a hardcopy.** Ensure Proper Invoice complies with all requirements detailed in Appendix B – Supplementary Conditions. Email title shall include **"URGENT – PROGRESS PAYMENT REQUEST for Contract T-1050-2025"** and be marked as High Priority.

1.4 Workers' compensation clearance

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

1.5 Statutory declarations

- .1 Submit a statutory declaration in the form of CCDC 9A-2018 – Statutory Declaration of Progress Payment Distribution by Contractor with each application for payment except the first.

1.6 Payment for products stored off site

- .1 Owner may, due to extraordinary circumstances and at Owner's sole discretion, make payments for Products delivered to and stored at a location other than Place of the Work, subject to:
 - .1 A request submitted by Contractor in writing, with appropriate justification, and;
 - .2 Whatever conditions Owner or Consultant may establish for such payments, as required to protect Owner's interests.

2 Products – not used

3 Execution – not used

End of section

1 General

1.1 Summary

- .1 The Work of this Section includes, but is not limited to the following:
 - .1 Administrative Requirements
 - .2 Construction Start-Up Meeting
 - .3 Progress Meetings
 - .4 Pre-Installation Meetings for Complex Equipment/Systems
 - .5 Pre-Takeover Meeting
 - .6 Post-Construction Meeting

1.2 Administrative requirements

- .1 Responsibility matrix outlined below identifies parties responsible for scheduling meetings, preparing meeting agenda, taking meeting minutes and distribution of information (meeting agenda and minutes) to all required parties.

Meeting Type	Task	Owner's Responsibility	Contractor's Responsibility
Construction Start-Up Meeting	Scheduling of Meeting	X	
	Preparing Meeting Agenda	X	
	Taking Meeting Minutes	X	
	Distribution of Information	X	
Progress Meetings	Scheduling of Meeting	X	
	Preparing Meeting Agenda	X	
	Taking Meeting Minutes	X	
	Distribution of Information	X	
Pre-Installation Meetings for Complex Equipment/Systems	Scheduling of Meeting		X
	Preparing Meeting Agenda		X
	Taking Meeting Minutes		X
	Distribution of Information		X

Meeting Type	Task	Owner's Responsibility	Contractor's Responsibility
Pre-Takeover Meeting	Scheduling of Meeting		X
	Preparing Meeting Agenda		X
	Taking Meeting Minutes		X
	Distribution of Information		X
Post-Construction Meeting	Scheduling of Meeting	X	
	Preparing Meeting Agenda	X	
	Taking Meeting Minutes	X	
	Distribution of Information	X	

- .2 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 Owner.

1.3 Construction start-up meeting

- .1 Within five (5) Working 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 Contractor, site superintendent(s), inspection and testing company, and authorities having jurisdiction, as applicable and at their discretion, will be in attendance.
- .1 Coordinate and organize attendance at the pre-construction meeting by representatives of major Subcontractors and other parties in contract with the Contractor.
- .2 Owner will arrange attendance of other interested parties not responsible to the Contractor.
- .3 The Owner shall organize and chair the contract start-up meeting. Owner shall record minutes of the contract start-up meeting and distribute a copy to each participant within five (5) Working Days of meeting.
- .4 Agenda to include, but not limited to the following:
- .1 Appointment of official representatives of Owner, Contractor, and Subcontractors;
- .2 Project communications;
- .3 Contract Documents for construction purposes;

- .4 Documents at the site;
- .5 Contractor's use of premises;
- .6 Owner-supplied Products;
- .7 Work restrictions;
- .8 Substitution procedures;
- .9 Contract modification procedures;
- .10 Payment procedures;
- .11 Construction progress meetings;
- .12 Construction progress schedule, including long lead time items;
- .13 Submittals schedule and procedures;
- .14 Special procedures;
- .15 Quality requirements, including testing and inspection procedures;
- .16 Contractor's mobilization;
- .17 Temporary utilities;
- .18 Existing utility services;
- .19 Construction facilities;
- .20 Temporary barriers and enclosures;
- .21 Temporary controls;
- .22 Field engineering and layout of work;
- .23 Site safety;
- .24 Site security;
- .25 Cleaning and waste management;
- .26 Closeout procedures and submittals;
- .27 Demonstration and training (when required on the Project);
- .28 Commissioning (when required on the Project).

1.4 Progress meetings

- .1 Owner's responsibilities for progress meetings:
 - .1 Schedule regular bi-weekly construction progress meetings for the duration of the Work.
 - .2 Prepare meeting agendas, chair the meetings, and record and distribute the minutes.

- .3 Arrange for and provide physical space for meetings.
- .4 Record in the meeting minutes significant decisions and identify action items and action dates by attendees or the parties they represent.
- .5 Distribute copies of minutes within three (3) Working Days after each meeting to attendees and any affected parties who may not be in attendance.
- .2 Contractor's responsibilities for progress meetings:
 - .1 Ensure that Subcontractors attend as and when appropriate to the progress of the Work.
- .3 Agenda for each meeting shall include the following, as a minimum:
 - .1 Approval of minutes of previous meeting, where required;
 - .2 Work progress since previous meeting;
 - .3 Field observations, including any problems, difficulties, or concerns;
 - .4 Construction progress schedule;
 - .5 Submittals schedule;
 - .6 Proposed changes in the Work;
 - .7 Requests for information;
 - .8 Site safety issues; and
 - .9 Other business.

1.5 Pre-installation meetings for complex equipment/systems

- .1 Contractor's responsibilities for pre-installation meetings:
 - .1 Schedule pre-installation meetings, when necessary, for installation of complex equipment or systems. Ensure coordination with the Contract Documents, location of anchoring points/devices, location of required structural supports, and discuss any conditions that would impact the installation of the equipment/system in question.
 - .2 As far as possible, schedule pre-installation meetings to take place on the same day as regularly scheduled progress meetings.
- .2 Agenda to include the following:

- .1 Review of existing conditions and affected work and testing thereof as required.
- .2 Review of installation procedures and requirements.
- .3 Review of environmental and site condition requirements.
- .4 Requirements for inspections and tests, as applicable.
- .5 Special safety requirements and procedures.
- .3 The following shall be in attendance:
 - .1 Contractor.
 - .2 Subcontractors affected by the work for which the pre-installation meeting is being conducted.
 - .3 Owner.
 - .4 Manufacturer's representatives, as applicable.
 - .5 Inspection and testing company, as applicable.

1.6 Pre-takeover meeting

- .1 Prior to application for Substantial Performance of the Work, the Contractor shall 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 the following:
 - .1 Requests for interpretation (RFI) and log;
 - .2 Proposed Change Orders, Change Orders, and Change Directives;
 - .3 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 close-out documentation.
- .11 Other business.

1.7 Post-construction meeting

- .1 Prior to application for completion of Contract, the Owner shall schedule a post-construction meeting.
 - .1 Three (3) Working Days prior to date for meeting, Owner shall confirm the 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 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 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.
- .17 Review of requests for interpretation log.

2 Products – not used

3 Execution – not used

End of section

1 General

1.1 Summary

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

1.2 Construction progress schedule

- .1 Format and content:
 - .1 Prepare schedule in the form of a Critical Path Method (CPM) Gantt chart using appropriate scheduling software, as approved by the Owner.
 - .2 Provide a work breakdown structure identifying key activities, work packages, and major milestones, including long delivery Products, inspection and testing activities, preparation and review of mock-ups, Owner decisions for cash allowances, shutdown or closure activities, demonstration and training activities, and similar items, at a sufficient level of detail to effectively manage construction progress.
 - .3 Provide a separate line for each required submittal, organized by Specifications section names and numbers, and further broken down by individual Products and systems as required.
 - .1 For each required submittal, show planned earliest date for initial submittal and latest date for return of reviewed submittal without causing delay.
 - .2 Allow time in schedule for resubmission of submittals, should resubmission be necessary.

- .4 Submit updated cash flow diagram quarterly.
 - .1 Cash flow diagram shall be in format acceptable to the Owner.
 - .2 Cash flow diagram shall represent Contractor's anticipated invoicing.
- .2 Submission:
 - .1 Submit a preliminary schedule to Owner within fifteen (15) Working Days after Contract award.
 - .2 Submit schedule via e-mail as a pdf. File, unless otherwise noted.
 - .3 Owner will review format and content of initial schedule and request necessary changes, if any, within five (5) Working Days after receipt.
 - .4 If changes are required, resubmit finalized initial schedule within five (5) Working Days after return of review copy.
 - .5 Submit updated construction schedule with each application for payment and whenever requested by the Owner, identifying changes since the previous version.
 - .6 At each regular progress meeting, review and discuss current construction progress and submittals schedules with Owner, including activities that are behind schedule and planned measures to regain schedule slippage in key areas on or near the critical path.
 - .1 Construction schedule updates include, but are not limited to the following:
 - .1 Indicate projected percentage of completion of each item as of first day of month;
 - .2 Indicate progress of each activity to date of submission schedule;
 - .3 Indicate changes occurring since previous submission of schedule, such as:
 - .1 Major changes in scope;
 - .2 Activities modified since previous submission;
 - .3 Revised projections of progress and completion;

- .4 Other identifiable changes.
 - .4 Provide a narrative report to define:
 - .1 Problem areas, anticipated delays, and impact on schedule;
 - .2 Corrective action recommended and its effect;
 - .3 Effect of changes on schedules of Other Contractors.
 - .3 Submission of the schedules referred to in this Section shall constitute the Contractor's representation that:
 - .1 Contractor and its Subcontractors intend to execute the Work in the sequence indicated on the proposed schedule;
 - .2 Contractor has distributed the proposed schedule to its Subcontractors for their review and comment, and has obtained their agreement;
 - .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.

1.3 Extension of Contract Time

- .1 Submit to the Owner, 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 Owner.

1.4 Progress reporting

- .1 Monthly progress reports shall be prepared by the Contractor and submitted to the Owner in the form an 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 Owner 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 32 33.
- .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. 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.
- .5 The monthly progress reports and progress schedules will be used by the Owner to monitor the Contractor's performance against the current Contract Schedule.

1.5 Recording actual site conditions on as-built drawings

- .1 Obtain from Owner an electronic copy of the construction Drawings for the purpose of creating as-built drawings. Record information in electronic form, clearly identifying as-built deviations from the originally obtained construction Drawings.
- .2 Clearly label each drawing as "AS-BUILT DRAWING". Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .3 Record actual construction including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum;
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements;
 - .3 Measured locations of pipes, ducts, conduits, outlets, fixtures, access panels, and appurtenances, referenced to visible and accessible features of construction;
 - .4 Field changes of dimension and detail;
 - .5 Changes made by Change Orders and Supplemental Instructions;

.6 References to Shop Drawings, where Shop Drawings show more detail.

.4 Do not use as-built drawings for construction purposes.

2 Products – not used

3 Execution – not used

End of section

1 General

1.1 Summary

- .1 The Work of this Section includes, but is not limited to the following:
 - .1 Administrative requirements
 - .2 Shop Drawings and Product Data
 - .3 Samples

1.2 Administrative requirements

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

- .2 Verify field measurements and that affected adjacent work is coordinated.
- .3 Submittals not meeting specified requirements will be returned with comments.
- .8 Owner's review of submittals:
 - .1 Review of submittals by Owner 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 Owner 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, Owner shall review submittals no more than two (2) times. Should three (3) or more reviews be required due to reasons of Contractor omissions causing resubmission requests, then Contractor shall reimburse the Owner for time expended in these extra reviews.
 - .1 Time shall be invoiced to the Owner (to be deducted from monies due to the Contractor and paid by Owner) at rates recommended by Owner's professional association and disbursements shall be invoiced at Owner's cost.
 - .2 The Contractor shall cover directly costs and administration associated with courier services and the like for these extra shop drawing reviews.
 - .4 Owner'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 Owner will not be reviewed by the Owner and will be marked 'NOT REVIEWED' by the Owner and returned to the Contractor.

- .6 Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Owner's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - .1 Initial Review: Allow three (3) Working Days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Advise Contractor when a submittal being processed must be delayed for coordination.
 - .2 Resubmittal Review: Allow two (2) Working Days for review of each resubmittal.
- .7 Use for construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with reviewed notation from Owner's action stamp.
- .9 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 Owner, 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 Owner 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.
- .10 Keep copies of reviewed submittals at the Place of the Work in a neat, orderly condition. Only submittals that have been reviewed by the Owner's and are marked with Owner's review stamp, as applicable, are permitted at the Place of the Work.
- .11 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.

1.3 Shop Drawings and product data

- .1 Indicate Products, methods of construction, and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of the Work.

- .2 Where Products attach or connect to other Products, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross-references to Drawings, Specifications and other already reviewed Shop Drawings.
- .3 Accompany submittals with a transmittal information including:
 - .1 Date;
 - .2 Project title and number;
 - .3 Contractor's name and address;
 - .4 Identification of each submittal item and quantity;
 - .5 Other pertinent data.
- .4 Each submittal shall be identified numerically by relevant technical trade 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 Owner may require, consistent with Contract Documents, and resubmit as directed by Owner.
- .6 Notify Owner, in writing, when resubmitting, of any revisions other than those requested by Owner.
- .7 Shop Drawing submittals shall include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, date, and signature of Contractor's authorized representative responsible for Shop Drawing review, indicating that each Shop Drawing has been reviewed for compliance with Contract Documents and, where applicable, that field measurements have been verified.
 - .5 Details of appropriate portions of the Work as applicable:
 - .1 Fabrication.

- .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationships to other parts of the Work.
- .8 Product data submittals shall include material safety data sheets (MSDS) for all controlled Products.
 - .9 Submit electronic copy of Shop Drawings where specified in the technical Specifications in .pdf format.
 - .10 Submit electronic copy of Product data sheets or brochures where specified in the technical Specifications in .pdf format.
 - .11 Where a submittal includes information not applicable to the Work, clearly identify applicable information and strike out non-applicable information.
 - .12 Supplement standard information to include details applicable to Project.
 - .13 Allow five (5) Working Days for Owner's review of each submittal and incorporate in submittals schedule specified in Section 01 32 00. Allow additional three (3) Working Days where sub-Consultant or commissioning agent review is required.
 - .14 If upon Owner's review no errors or omissions are discovered, or if only minor corrections are required as indicated, submittal will be returned and fabrication or installation of Work may proceed.
 - .15 If upon Owner's review significant errors or omissions are discovered, a so noted copy will be returned for correction and resubmission. Do not commence fabrication or installation.
 - .16 Owner's notations on submittals are intended to ensure compliance with Contract Documents and are not intended to constitute a change in the Work requiring change to the Contract Price or Contract Time. If

Contractor considers any Owner's notation to be a change in the Work, promptly notify Owner in writing before proceeding with the Work.

- .17 Resubmit corrected submittals through same procedure indicated above, before any fabrication or installation of the Work proceeds. When resubmitting, notify Owner in writing of any revisions other than those requested by Owner.

1.4 Samples

- .1 Submit samples for Owner's review in duplicate where specified in the technical Specifications. Label samples as to origin, Project name, Project Number, Contractor's name, and intended use.
- .2 Deliver samples prepaid to Owner's business address, unless otherwise identified by the Owner. When requested by Owner, provide samples within seven (7) Working Days of such request.
- .3 Notify Owner in writing of any deviations in samples from requirements of Contract Documents.
- .4 Where a required colour, pattern or texture has not been specified, submit full range of available Products meeting other specified requirements.
- .5 Owner selection from samples is not intended to change the Contract Price or Contract Time. If a selection would affect the Contract Price or Contract Time, notify Owner in writing prior to proceeding with the Work.
- .6 Resubmit samples as required by Owner to comply with Contract Documents.
- .7 Include in the Contract Price the cost of delivery and handling, assembly, and return to Supplier of samples, where necessary.
- .8 Reviewed and accepted samples will establish the standard against which installed Work will be reviewed.
- .9 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.

- .10 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.

2 Products – not used

3 Execution

3.1 Submissions

- .1 Submit the following to the Owner:
 - .1 Upon notification of award of this project, and prior to commencing work:
 - .1 Performance and Labour and Materials Payment Bonds Insurance in accordance with the Requirements of Section 00 61 14.
 - .2 Certificate(s) of Insurance in accordance with the Requirements of Section 00 61 14. Use the Owner's Certificate of Insurance form.
 - .3 Clearance Certificate from Workplace Safety & Insurance Board (WSIB).
 - .2 During construction:
 - .1 Progress reports;
 - .2 Update of any insurance certificates about to expire;
 - .3 Current valid WSIB clearance certificate;
 - .4 Shop Drawings, product data and samples;
 - .5 Minutes of meetings;
 - .6 Inspection reports;
 - .7 Change Orders and Change Directives;
 - .8 Requests for information (RFI);
 - .9 Updated Construction Drawings;
 - .10 Updated Construction Schedule;
 - .3 At Substantial Performance of the Work, provide originals of:
 - .1 Statutory declaration;
 - .2 Occupancy permit;

- .3 Substantial performance release of claims letter;
- .4 Update of any insurance certificates about to expire;
- .5 Current valid WSIB certificate of clearance;
- .6 Extended warranties, if applicable;
- .7 Closeout submittals; As indicated in Section 01 78 00.
- .4 At completion:
 - .1 Update of any insurance certificates about to expire;
 - .2 Current valid WSIB certificate of clearance;
 - .3 Completion release of claims letter;
 - .4 Owner's standard form for property owner's release of land used by the Contractor.
- .5 At end of warranty period:
 - .1 Final release of claims letter.

End of section

1 General

1.1 Summary

- .1 The Work of this Section includes, but is not limited to the following:
 - .1 Health and safety administrative requirements for Contractors performing work on this Project, for the Owner.

1.2 Reference standards

- .1 Province of Ontario website:
 - .1 Regulation 851; LGIC:
 - .1 Pre-Start Health and Review Requirements for Factories
 - .2 Construction site health and safety during COVID-19
 - .1 <https://www.ontario.ca/page/construction-site-health-and-safety-during-covid-19>
 - .3 Resources to prevent COVID-19 in the workplace
 - .1 <https://www.ontario.ca/page/resources-prevent-covid-19-workplace#construction>
- .2 Canadian Construction Association (CCA):
 - .2 [COVID-19 - Standardized Protocols for All Canadian Construction Sites](#)

1.3 Health and safety policy

- .1 Obtain copies of all Subcontractors' Health and Safety Policies and Programs prior to such Subcontractor commencing work on the site if and when requested.
- .2 Provide a copy of Contractor's current Health and Safety Policies and Program, to implement that policy prior to the commencement of construction.

1.4 Health and safety legislation and requirements

- .1 Comply with all Federal and Provincial laws relating to Health and Safety including Acts and Regulations as well as Lower Tier Municipality By-Laws.

- .2 Comply with all applicable industry safety standards.
- .3 Comply with 213/91 (Construction Projects) made under the Occupational Health and Safety Act (OHSA) and all amendments thereto.
- .4 Comply with legislative requirements for work performed including, but not limited to:
 - .1 Qualifications of workers;
 - .2 Training;
 - .3 Supervision, and;
 - .4 Use of onsite equipment.
- .5 Provide any and all personal protective equipment for Contractor's own workers where prescribed by legislation.

1.5 Construction safety measures - Contractor's responsibilities

- .1 The Contractor shall ensure that its site superintendent (or designate in the absence of the Contractor's principal site superintendent) is present at the Project site and performs supervisory functions at all times as per provincial and local governmental occupational health and safety, fire safety, environmental protection, and workers' compensation statutes, public health guidance publications (where warranted), and Contract Documents.
- .2 The site superintendent shall be responsible for enforcing compliance with respect to the use of personal protective equipment required at the Project site. No person shall be permitted to enter the Place of Work without the required personal protective equipment.
- .3 Establish, maintain and mark clear routes, paths and points for routine and emergency entry and exit to, from and within the Project site for personnel and vehicles.
- .4 Keep floors and other surfaces at the Project site free of obstructions, hazards and accumulations of refuse, snow or ice. Liberally apply sand or salt to snow or ice-covered surfaces where necessary to reduce hazards of slipping and falling.
- .5 Make available at the Project site twelve (12) sets of new CSA-approved hard hats, CSA-approved all weather safety boots, safety eyewear (safety

glasses with side shields or safety goggles), and high visibility torso clothing (e.g. reflective vest, reflective shirt, reflective jacket) for the exclusive use of the Owner, Consultant and their representatives. Maintain in clean condition.

- .6 Provide first aid, hygiene, and medical facilities at the Project site in accordance with requirements of provincial and local governmental occupational health, safety, and workers' compensation statutes, public health guidance publications (where warranted) and Contract Documents.
- .7 Erect signage acceptable to the Owner at all entry points to the project containing the following information:
 - .1 The name, address and telephone number of the Contractor;
 - .2 Notice that all personnel on the Project site are required to comply with the safety policies, procedures and instructions of the Contractor;
 - .3 Notice specifying mandatory use and wearing of the protective equipment required by this Specification;
 - .4 Notice that any person or employer failing to adhere to the safety policies, procedures and instructions of the Contractor may be removed from the Project site and denied further access.
- .8 Erect signs relating to safety on the Project, and signs or notices required by applicable provincial and local regulations or by the Contract Documents.
- .9 Perform health and safety inspections of the Project site at least twice weekly, or more frequently if required by provincial or territorial health and safety regulatory requirements, in order to ensure that the Work is performed safely and that the Project site is maintained in accordance with the requirements of the provincial and local governmental regulations and the Contract Documents.
- .10 The Contractor shall complete and maintain on site, a documented record of each health and safety inspection, using the "Contractor's Twice Weekly Health and Safety Compliance Checklist".
- .11 Following completion of each health and safety inspection, the Contractor shall provide an electronic copy of the completed "Contractor's Health and

Safety Compliance Checklist” to the Owner’s designated health and safety specialist, with all progress draw applications.

- .12 At minimum, systems and devices for fall prevention and/or fall arrest shall be used and/or worn for any Work activity where a worker may fall a vertical distance of 3m (10’) or more. Where the province or territory has more stringent requirements for the use of fall protection the Provincial requirements will take precedence over those of the Contract Document.
- .13 Fall arrest harnesses attached to travel restraint lines or fall arrest lifelines shall be used and worn by all persons performing work upon rooftops.
- .14 The Contractor shall ensure ongoing compliance with the applicable provincial / territorial occupational health and safety laws, public health guidelines, as well as the Contractor’s own OHS policies and procedures.
- .15 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.

1.6 Construction safety measures – welding and/or cutting procedures

- .1 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 Safety data sheets (SDS)

- .1 Provide to the Consultant a list of Designated Substances that will be brought to the site prior to commencing work. Safety Data Sheets (SDS) and the hazardous material inventory for each substance listed must be kept on the Project.

- .2 Maintain copies of current SDS at the Place of the Work at a location accessible to all workers, the Consultant, the Owner and the building operators (where required).

1.8 Safety warnings

- .1 The Consultant and the Owner shall have the right to document all Contractors for all health and safety warnings and/or to stop any Contractor's work if the Contractor fails to comply with any requirements under this Section.
- .2 Similarly, the Consultant and the Owner shall have the right to issue warnings and/or to stop work for any Contractor violations of the contract including Owner health and safety policy and programs and/or if the Contractor creates a health or safety hazard.
- .3 Written warnings and/or stop work orders shall be given to the Contractor using the Owner's Contractor Health and Safety Warning / Stop Work Order Form.
- .4 If the Contractor fails to adequately respond to the Consultant's or the Owner's order to correct a hazard, the Owner reserves the right to have the hazard corrected by a third party at the Contractor's expense. The Consultant's or the Owner's decision, as the case may be, as to the urgency for such correction shall be final.

1.9 Notice of project

- .1 Notify all regulatory bodies required for construction activities, (i.e., Notice of Project, employer notification, etc.).
- .2 Notifications shall include, but not be limited to, the notification requirements laid out in OHSa Sec 51-53 and the requirements of Ontario Regulation 213/91 for Construction Projects, Sections 5, 6 and 7.
- .3 For the purpose of this contract the Contractor shall be the "Constructor".

1.10 Confined space

- .1 Persons intended to work in confined spaces, as defined by the Owner, must have formal training in performing work in confined spaces.

- .2 Provide proof of valid certificates of such training for all workers prior to entry of such workers into confined spaces.
- .3 Provide all necessary safety equipment for entry into confined spaces.
- .4 Where workers are required to enter a confined space, as defined by the OHSA, O. Reg. 632/05 Section 221.2, ensure that workers of the Contractor and all Subcontractors follow the requirements of the above legislation, including but not limited to:
 - .1 Having a method for recognizing each confined space to which the program applies;
 - .2 Having a method for assessing the hazards to which workers may be exposed;
 - .3 Having a method for the development of confined space entry plans (which include on-site rescue procedures);
 - .4 Having a method for training workers;
 - .5 Having an entry-permit system.
- .5 Supply the necessary tools and equipment for workers to perform the confined space entry. These items include, but are not limited to the following:
 - .1 Required documentation;
 - .2 Gas detectors;
 - .3 Breathing equipment;
 - .4 Fall protection, and;
 - .5 Rescue equipment.

2 Products – not used

3 Execution – not used

End of section

1 General

1.1 Summary

- .1 The Work of this Section includes, but is not limited to the following:
 - .1 Establishment of fire safety requirements for the Project.

1.2 Fire safety requirements

- .1 Fire safety plan:
 - .1 Contractors and their personnel shall be familiar with Section 2.8 of the Fire Code and its requirements for construction sites.
 - .2 A “fire safety plan”, is required to be prepared for the site prior to commencement of construction. The fire safety plan is required to include:
 - .1 The designation and organization of site personnel to carry out fire safety duties, including fire watch service where applicable.
 - .2 Emergency procedures to be used in the case of fire including sounding the alarm throughout the building, notifying the Fire Department, instructing site personnel on procedures to be followed and fire fighting procedures.
 - .3 The control of fire hazards in and around the building. This includes fire protection for combustible construction materials and combustible refuse on site.
 - .4 The maintenance of fire fighting facilities.
 - .3 The “fire safety plan”, is required to be submitted to the local Fire Department for approval and kept on-site in an approved location.
- .2 Fire prevention:
 - .1 Enforce fire prevention and protection methods of good housekeeping and adhere to local and Underwriters’ fire regulations.
 - .2 Except where a building is provided with a fire alarm system or similar equipment acceptable to the authorities having jurisdiction, a

fire watch, is required to be provided when a portion of the building is occupied during construction operations.

- .3 Where a fire watch is required in this Section, the following criteria are required to be achieved:
 - .1 The site will be toured at least once each hour;
 - .2 The fire watch personnel are required to be provided with a means of communication with the Fire Department and be equipped with portable illumination and protective equipment.
 - .3 A log documenting each tour of the site is required and it is to be kept.
 - .4 Unobstructed access, for fire fighting is required to be maintained to fire protection equipment, including hydrants, Fire Department connections and portable extinguishers.
 - .5 Where practical, Fire Department access route, are required to be provided, to the construction site. If the site is fenced in order to prevent general entry, provision is required to be made for access by Fire Department equipment and personnel.
- .3 Hot works:
- .1 Hot works, involving open flames or producing heat or sparks, are required to conform to CSA W117.2.
 - .2 Hot work equipment is required to be maintained in good operating condition, examined for leakage or defects prior to each use, and repaired, if necessary, prior to use. When Class 2 gas (i.e. compressed gas) hot work equipment is not in use, valves are required to be closed and gas lines bled. Electric hot work equipment is required to be de-energized when not in use.
 - .3 Hot work is required to be carried out in an area free of combustible and flammable contents, with walls, ceilings and floors of non-combustible construction or lined with non-combustible materials. When it is not practical to undertake hot works in such an area, the following measures are required to be taken:
 - .1 Combustible and flammable materials within a 15m (50') distance from the hot work are required to be either

- removed, protected against ignition by the use of non-combustible materials, or thoroughly wetted.
- .2 A fire watch is required to be provided during the hot work and for a period not less than 60 minutes after its completion. The exposed areas are required to be examined for ignition of combustible materials by personnel equipped with and trained in the use of fire extinguishing equipment.
- .3 A final inspection of the hot work area is required to be conducted 4hr after the completion of the work.
- .4 Where sparks may leak onto combustible materials in areas adjacent to the area where the hot work is to be performed, openings in walls, floors or ceilings are required to be covered or closed to prevent the passage of sparks to such adjacent areas or be protected in accordance with the requirements in Clause 1.1.3.3.
- .5 Hot work is not permitted to be performed on the following:
 - .1 Containers, equipment, or piping containing flammable or combustible liquids or Class 2.1 flammable gases unless they have been cleaned and tested with a gas detector to ascertain that they are free of explosive vapours;
 - .2 Totally enclosed containers, or;
 - .3 Metal objects that are in contact with combustible materials, unless safety precautions are taken to prevent ignition of the combustible materials by conduction.
- .6 When hot work is to be carried out near piping containing Class 2.1 flammable gases, the piping is required to be cleaned and tested with a gas detector to ascertain that they are free of explosive vapours and be protected by a thermal barrier against the passage of heat.
- .7 At least one portable fire extinguisher is required to be provided in the hot work area.
- .4 Post-fire reporting:
 - .1 Report immediately all fire incidents to the Fire Department, and Owner.
- .5 Interior and exterior fire protection and alarm systems:

- .1 A system that is audible throughout the building (e.g. air horns) is required to be provided to alert.
- .2 Fire protection and alarm systems shall not be:
 - .1 Obstructed;
 - .2 Shut-off;
 - .3 Left inactive at the end of a Working Day or shift without notification and authorization from the Fire Chief or their representative.
- .3 If a fire alarm system or part thereof, is shut down or inoperative for more than 2 hr for any reason, the authority having jurisdiction is required to be notified. When directed by the authorities having jurisdiction, a fire watch is required to be provided during the shut down of the fire alarm system.
- .4 Fire hydrants, standpipes and hose systems shall not be used for other than fire fighting purposes unless authorized by the Fire Chief.
- .6 Fire extinguishers:
 - .1 The Contractor shall supply fire extinguishers, to the satisfaction of the Fire Chief, necessary to protect, in an emergency, the work in progress and the Contractors physical plant on site. Listed Class A fire extinguishers having a minimum rating of 2A10BC are required to be provided on all moveable equipment. Listed Class A fire extinguishers with a minimum rating of 4A40BC are required in all other areas to protect a maximum area of 600m² each, and located so that the maximum travel distance to an extinguisher is 25m.
 - .2 In addition to the requirements in Clause 1.1.6.1, fire extinguishers are required to be provided adjacent to welding or cutting operations, in areas where combustibles are stored, near or on any internal-combustion engines, adjacent to areas where flammable liquids or gases are stored/handled, adjacent to temporary oil-fired or gas-fired equipment, and adjacent to bitumen heating equipment.

.7 Blockage of roadways:

- .1 The site superintendent shall be advised of any work that would impede fire apparatus response. This includes violation of minimum overhead clearance of 5m, erecting of barricades and the digging of trenches.

.8 Smoking precautions:

- .1 Although smoking is not permitted in hazardous areas, care must still be exercised in the use of smoking materials in non-restricted areas. Signs are required to be posted to indicate areas where smoking is not permitted. Signs are required to have black lettering not less than 50mm x 150mm are permitted to be used in lieu of lettering. Alternatively, symbols of not less than 150mm x 150mm are permitted to be used in lieu of lettering.

.9 Rubbish and waste materials:

- .1 Rubbish and waste materials are to be kept to a minimum.
- .2 Combustible waste materials are not permitted to accumulate in quantities or locations that constitute an undue fire hazard.
- .3 The burning of rubbish on site is prohibited.
- .4 Removal:
 - .1 All rubbish shall be removed from the work site at the end of the Working Day or as directed.
 - .2 Waste material is required to be removed by means of appropriate containers, an enclosed shaft or chute conforming to NBC Sentence 8.2.7.4.(1) or a hoisting apparatus if large pieces or objects are involved.
- .5 Storage:
 - .1 Extreme care is required where it is necessary to store oily waste in work areas to ensure maximum possible cleanliness and safety.
 - .2 A non-combustible receptacle constructed of materials with a melting point of not less than 650 degrees Celsius and having no openings in the sides or bottom and a self-closing, tightly fitted metal cover is required to be provided for the collection of greasy or oily rags or materials subject to

spontaneous combustion, or ashes. If the flooring material upon which the receptacle is placed is combustible, the receptacle is required to have a flanged bottom or legs not less than 50mm high. The contents of this receptacle are required to be removed daily and disposed of in a manner that does not create a fire hazard.

.10 Flammable liquids:

- .1 The handling, storage and use of flammable liquids is required to be in conformance with Part 4 of the Fire Code.
- .2 Flammable liquids such as gasoline, kerosene and naphtha may be kept for ready use in quantities not exceeding 45 litres provided they are stored in approved safety cans bearing the Underwriter's Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable liquids exceeding 45 litres for work purposes requires the permission of the Site Superintendent.
- .3 Transfer of flammable liquids is prohibited within buildings.
- .4 Transfer of flammable liquids shall not be carried out in the vicinity of open flames or any type of heat-producing devices.
- .5 Flammable liquids having a flash point below 38 degrees Celsius such as naphtha or gasoline shall not be used as solvents or cleaning agents.
- .6 Flammable waste liquids, for disposal, shall be stored in approved containers located in a safe ventilated area. Quantities are to be kept to a minimum and the Fire Department is to be notified when disposal is required.
- .7 Spills of flammable or combustible liquids are required to be removed immediately with an absorbent material that will not increase the hazard and be disposed of in a safe manner.

.11 Hazardous substances:

- .1 If the Work entails the use of any dangerous goods (e.g. toxic or hazardous materials, chemicals and/or explosives, or otherwise creates a hazard to life, safety, health or the environment), perform Work in accordance with Section 01 35 43, and the OBC.

.12 Floor finishing:

- .1 Floor finishing operations involving the use of flammable or combustible liquids are required to be provided with ventilation to prevent the accumulation of flammable vapours. Mechanical ventilation is permitted if the equipment does not constitute a source of ignition.
- .2 All sources of ignition (including mechanical systems or electric motors) are required to be shut down.
- .3 Smoking and the use of open flames is not permitted during the application of flammable liquids with flash points less than 37.8 degrees Celsius and for at least 1hr after such application.

.13 Compressed gas cylinders:

- .1 Cylinders of Class 2 (compressed) gases are required to be:
 - .1 Protected against mechanical damage;
 - .2 Protected against valve damage, and;
 - .3 Firmly secured in a position that will not interfere with the operation of the cylinder valve assembly.
- .2 Except for fire extinguishers, cylinders of Class 2 gases are not permitted to be stored:
 - .1 In any exit or corridor providing access to exit;
 - .2 Under any fire escape, outside exit stair, passage or ramp, or;
 - .3 Within 1m of any exit.

.14 Egress provisions:

- .1 At least one exit is required to be accessible and usable at all times.

.15 Excavation:

- .1 All existing gas, electrical, water, steam and other services are permitted to be left within the area of excavation provided that the service company approves the proposed method of operation, their location is determined before excavation commences, the method of excavation will not damage the services and suitable temporary supports are provided.

- .2 Existing services that do not meet the criteria in Clause 1.1.16.1 are required to be shut-off, capped and labelled prior to excavation. The service company whose service connections will be affected are required to be notified in advance. Service connections that are required to be maintained are required to be relocated and protected from damage.
- .3 Excavations are required to be kept reasonable clear of water so as not to endanger the safety of the public or to create conditions hazardous to health.

2 Products – not used

3 Execution – not used

End of section

1 General

1.1 Summary

- .1 The Work of this Section includes, but is not limited to the following:
 - .1 Hazardous substances
 - .2 Environmental protection

1.2 General requirements

- .1 Assume responsibility for the protection of the environment and the preservation of public health, in the course of and as affected by the Work of the Contract, in accordance with specified requirements and applicable laws, ordinances, rules, regulations, codes and orders of jurisdictional authorities.
- .2 Give required notices and follow procedures set out by Authorities having Jurisdiction when working adjacent to or in waterways.
- .3 Give required notices and follow procedures set out by Authorities having Jurisdiction when handling or encountering hazardous, toxic, controlled substances (hereinafter referred to as hazardous substances).

1.3 Definitions

- .1 The following conditions shall be regarded as a hazard to the environment, requiring appropriate action within the scope of this Section:
 - .1 Soil contamination (PCB, metals, hydrocarbon, radioactive matter, herbicides, pesticides, other hazardous substances).
 - .2 Presence of friable asbestos.
 - .3 Presence of abandoned or disused equipment such as fuel tanks, PCB containing equipment and materials (including in-ground hydraulic hoists), batteries, septic tanks, grease / oil interceptors.
 - .4 Erosion, sedimentation and general disturbance of ecosystems.
 - .5 Other conditions identified by environmental jurisdictional authorities.

1.4 Hazardous substances

- .1 “Substances Posing Significant Hazard” means any biological, chemical or physical agent or combination thereof to which exposure of a worker is prohibited, regulated, restricted, limited or controlled by the occupational health and safety enforcement agency of the province/ territory where the Work is to be performed. Should no such provisions be in place in the province/territory where the Work is to be performed, the following substances shall be considered as “Substances Posing Significant Hazard”: Asbestos, Silica, Mercury, Lead, Arsenic, Acrylonitrile, Benzene, and Isocyanates.”
- .2 Submit documentation to Consultant to show that all Subcontractors have been provided with lists of the Substances Posing Significant Hazard on site. This list must include both, the name of the substances indicated by the Owner to be on site, as well as any such substance to be used or produced by the Contractor or Subcontractors on site during the life of the Project.
- .3 Procedures:
 - .1 Known conditions: Follow specified requirements in Contract. In case of conflict inform Consultant in writing prior to proceeding.
 - .2 Accidental spills: Immediately proceed to contain and clean up in accordance with applicable regulations. Where procedures are not known, immediately notify appropriate jurisdictional authority and request directions. Inform Consultant in writing.
 - .3 Unknown conditions: Should an environmentally hazardous condition or a contaminated area be discovered, quarantine the area affected and do no work that will disturb the hazardous material or contaminated area. Notify the Consultant immediately of the situation verbally and in writing. Conform to applicable legislation and regulations.
- .4 Hazardous substances disposal:
 - .1 Dispose of hazardous substances in accordance with applicable regulations and as directed by Consultant.

- .2 Do not under any circumstances, dispose of hazardous substances by burning or burying on site or by discharging into the soil, waterways or drainage system.

1.5 Environmental protection

- .1 Disposal:
 - .1 Fires and burning of rubbish on site not permitted.
 - .2 Do not bury rubbish and waste materials on site.
 - .3 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.
 - .4 Comply with local requirements for sorting and recycling of waste and debris.
- .2 Dust and particulate control:
 - .1 Implement and maintain dust and particulate control measures in accordance with applicable regulatory requirements.
 - .2 Execute Work by methods that minimize dust from construction operations and spreading of dust on site or to adjacent properties.
 - .3 Provide temporary enclosures to prevent extraneous materials resulting from sandblasting or similar operations from contaminating air beyond immediate work area.
 - .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
 - .5 Use appropriate covers on trucks hauling fine, dusty, or loose materials.
- .3 Noise control:
 - .1 Take measures to control noise and vibration generated by the Work.
 - .2 Comply with the requirements of Authorities having Jurisdiction and Noise Control By-Law, to ensure noise generated by the Work is not excessive and not disturbing to the Public and the Owner's and User's of adjacent buildings / properties.

- .3 These requirements shall not be construed as cause for elimination or restriction of Contractor's working schedule, claims for delay of work nor additional costs.

1.6 Designated substances survey and reporting

- .1 A Designated Substance Survey or Asbestos Survey is provided with the Contract Documents. Review the report for specific designated substances and locations.
- .2 Comply with the governing Ministry of Labour regulations respecting protection of workers, removal, handling and disposition of any Designated Substances encountered in carrying out the Work proposed on this contract.
- .3 Prior to commencement of this work, provide written notification to the Ministry of the Environment, Conservation and Parks at their York-Durham District Office, 230 Westney Rd. S., 5th floor, Ajax, Ontario L1S 7J5, of the location(s) proposed for disposal of Designated Substances. Provide a copy of the notification to the Consultant a minimum of two weeks in advance of such work starting.
- .4 If the Ministry of the Environment, Conservation and Parks has concerns with any proposed disposal location, provide further notification until the Ministry's concerns have been addressed.

2 Products – not used

3 Execution – not used

End of section

1 General

1.1 Summary

- .1 The Work of this Section includes, but is not limited to the following:
 - .1 Reference standards and Codes
 - .2 Authorities having jurisdiction
 - .3 Independent inspection and testing agency requirements
 - .4 Inspection and testing agency reports
 - .5 Quality assurance
 - .6 Metric vs. Imperial equipment
 - .7 Permits
 - .8 Exterior sanitary and storm sewer video inspection
 - .9 Interior under slab sanitary and storm drainage video inspection
 - .10 Testing procedures
 - .11 Testing laboratories
 - .12 Notification of non-compliance

1.2 Reference standards and codes

- .1 “Reference standards” means consensus standards, trade association standards, guides, and other publications expressly referenced in Contract Documents.
- .2 Where an edition or version date is not specified, referenced standards shall be deemed to be the latest edition or revision issued by the publisher at the time of bid closing. However if a particular edition or revision date of a specified standard is referenced in an applicable code or other regulatory requirement, the regulatory referenced edition or version shall apply.
- .3 Reference standards establish minimum requirements. If Contract Documents call for requirements that differ from a referenced standard, the more stringent requirements shall govern.

- .4 If compliance with two or more reference standards is specified and the standards establish different or conflicting requirements, comply with the most stringent requirement. Refer uncertainties to Owner for clarification.
- .5 Within the Specifications, reference may be made to the following standards writing, testing, or certification organizations by their acronyms or initialisms:
 - .1 American Institute of Steel Construction (AISC)
 - .2 American National Standards Institute (ANSI)
 - .3 American Society for Testing and Materials (ASTM)
 - .4 Architectural Woodwork Manufacturers Association of Canada (AWMAC)
 - .5 Canadian Construction Association (CCA)
 - .6 Canadian General Standards Board (CGSB)
 - .7 Canadian Institute of Steel Construction (CISC)
 - .8 Canadian Standards Association (CSA)
 - .9 Canadian Welding Bureau (CWB)
 - .10 Institute of Electrical and Electronics Engineers (IEEE)
 - .11 Master Painters Institute (MPP)
 - .12 National Electrical Manufacturers Association (NEMA)
 - .13 National Fire Protection Association (NFPA)
 - .14 Terrazzo, Tile and Marble Association of Canada (TTMAC)
 - .15 Underwriters' Laboratories of Canada (ULC)
- .6 Perform the Work in accordance with the requirements of the latest editions of the following statutes and codes in force at the time of the Contract:
 - .1 Electrical Safety Authority
 - .2 Municipal building and fire codes and by-laws
 - .3 National Building Code
 - .4 National Fire Protection Association
 - .5 Ontario Building Code
 - .6 Ontario Construction Safety Act
 - .7 Ontario Electrical Safety Code

- .8 Ontario Fire Code
- .9 Ontario Hydro
- .10 WHIMS
- .7 Comply with any applicable revisions to codes and regulations after the date of the agreement. Costs of such revisions shall be compensated for through a Change Order.
- .8 Precedence of standards:
 - .1 Where applicable, ensure that all materials and equipment conform to the applicable standards listed.
 - .2 Canadian standards take precedence over American standards in the case of duplication or conflict.

1.3 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.

1.4 Independent inspection and testing agencies

- .1 Except as otherwise specified, Owner will retain and pay for independent inspection and testing agencies to inspect, test, or perform other quality control reviews of parts of the Work.
- .2 Retain and pay for inspection and testing that is for Contractor's own quality control or is required by regulatory requirements.
- .3 Employment of inspection and testing agencies by Contractor or Owner does not relieve Contractor from responsibility to perform the Work in accordance with Contract Documents.
- .4 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.

.5 Responsibilities of the Owner:

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

.6 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 their 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.
- .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 Owner, 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 Subcontractors prior to application of final cover materials i.e. pressure plates, drywall ceilings, concrete slab pours and the like.
- .7 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.
- .8 Allow and arrange for inspection and testing agencies to have access to the Work, including access to offsite manufacturing and fabrication plants.
- .9 For inspection and testing required by Contract Documents or by authorities having jurisdiction, provide Owner and inspection and testing agencies with timely notification in advance of required inspection and testing.
- .10 Submit test samples required for testing.
- .11 Provide labour, Construction Equipment and temporary facilities to obtain and handle test samples on site.

1.5 Inspection and testing agency reports

- .1 For inspection and testing required by Contract Documents or by regulatory requirements, and performed by Contractor retained inspection and testing agencies, submit to Owner an electronic copy of reports. Submit within five (5) Working Days after completion of inspection and testing.
- .2 For inspection and testing performed by Owner retained inspection and testing agencies, copies of inspection and testing agency reports will be provided to Contractor.
- .3 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 technical trade Sections 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.

1.6 Quality assurance

- .1 Regulatory requirements: The provisions of the Occupational Health and Safety Act and Regulations are in full effect and in force on this Project, and as follows:
 - .1 For all the purposes of this Act, the Contractor is responsible for the health and safety of the workers at the site and shall post the appropriate notice on the site as required.
 - .2 All personnel employed at the Place of Work shall receive education and training in regard to the requirements of the Workplace Hazardous Materials Information System (WHMIS).
 - .3 For every Product delivered to the site which requires a Safety Data Sheet (SDS) provide an electronic copy of all SDS's to the Owner.

1.7 Metric vs. Imperial equipment

- .1 Notwithstanding the requirements set out in the preceding paragraphs, because not all trades have adopted metric material or in cases of adapting to existing, where metric and imperial types of equipment are to be installed under the same contract, the Contractor shall ensure that mating of metric and non-metric equipment is possible.
- .2 Supply shop drawings of proposed transition couplings, etc., to the Owner prior to assembly. The supply and installation of such couplings, adapters, etc., shall be at no additional cost to the Owner.
- .3 Provide electronically powered equipment, components, and supplies that are CSA and ULC approved.

1.8 Permits

- .1 The Owner will obtain and pay for the building permit, permanent easements and rights of servitude only.
- .2 Obtain all other necessary permits and approvals required for this project from the authorities having jurisdiction for all completed Work.
- .3 Keep a copy of all permits on site.

1.9 Testing procedures

- .1 Perform specified or required tests to verify that control measures are adequate to provide a Product which conforms to Contract requirements. Upon request, supply to the Owner duplicate samples of test specimens for possible testing by the Owner. Testing includes operation and/or acceptance tests when specified.
- .2 Procure the services of a competent testing laboratory to perform the following activities and record and provide the following data:
 - .1 Verify that testing procedures comply with Contract requirements;
 - .2 Verify that facilities and testing equipment are available and comply with testing standards;
 - .3 Check test instrument calibration data against certified standards;
 - .4 Verify that recording forms and test identification control number system, including all the test documentation requirements, have been prepared.
- .3 Results of all tests taken, both passing and failing tests, will be recorded for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test will be given.
- .4 Failure to submit timely test reports as stated may result in nonpayment for related Work performed and disapproval of the test facility for this Contract.

1.10 Testing laboratories

- .1 Capability check:
 - .1 The Owner reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the Contract specifications and to check the laboratory technician's testing procedures and techniques.
 - .2 Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D3740 and ASTM E329.

1.11 Notification of noncompliance

- .1 The Owner will notify the Contractor of any detected noncompliance with the foregoing requirements, take immediate corrective action after receipt of such notice.
- .2 Such notice, when delivered to the Contractor at the worksite, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Owner may issue an order stopping all or part of the Work until satisfactory corrective action has been taken.
- .3 No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

2 Products – not used

3 Execution – not used

End of section

1 General

1.1 Summary

- .1 Establish a minimum packaging, shipping and handling quality for Suppliers of goods, including but not limited to:
 - .1 Preservation of goods;
 - .2 Acceptable use of packaging materials;
 - .3 Handling requirements as specified by the material manufacturers so not to damage materials or void material warranties;
 - .4 Required, complete documentation indicating delivery location, quantity, list of goods, and any special delivery instructions needed by the Contractor to receive the shipment.

1.2 Reference Standards

- .1 American Society for Testing and Materials (ASTM):
 - .1 ASTM D5118/D5118M-15, Standard Practice for Fabrication of Fiberboard Shipping Boxes
 - .2 ASTM D4728-17, Standard Test Method for Random Vibration Testing of Shipping Containers
 - .3 ASTM D6179-07(2014), Standard Test Methods for Rough Handling of Unitized Loads and Large Shipping Cases and Crates
 - .4 ASTM D642-15, Standard Test Method for Determining Compressive Resistance of Shipping Containers, Components, and Unit Loads
 - .5 ASTM D4169-16, Standard Practice for Performance Testing of Shipping Containers and Systems
 - .6 ASTM D1185-98a(2017), Standard Test Methods for Pallets and Related Structures Employed in Materials Handling and Shipping

1.3 Administrative requirements

- .1 All goods received including preservation and packaging materials together with package markings and documentation may be subject to inspection by the Contractor.

- .2 Any costs incurred by the Owner due to delays in shipment, because of failure by the Supplier to comply with this Specification will be charged to the Supplier.

1.4 Quality assurance of goods for shipment

.1 Packaging:

- .1 The Supplier must ensure that the method of packaging provides effective protection against damage in handling and transport between the Supplier and the final storage of the goods.
- .2 All packaging and packing materials used must be able to withstand remote field conditions, including, but not limited to significant UV exposure, moisture and extreme temperatures.
- .3 Goods shall be supplied in packages clearly identifying the item number and quantity.
- .4 Any package which appears to be manageable by a single person should be limited to 15kg. If the package weighs greater than 15kg then it must be easily identifiable.

.2 Preservation:

- .1 The Supplier must ensure that all goods are suitably protected to prevent corrosion during handling, transport and storage.
- .2 Goods that have openings must be sealed with caps, plugs or waterproof tape to prevent the ingress of dust and moisture.
- .3 Goods with painted surfaces shall be suitably protected to prevent rubbing or scuffing during transport.
- .4 All surfaces that are subject to corrosion must be treated with an appropriate temporary corrosion preventative.
- .5 Goods that are susceptible to climatic conditions must be packed in moisture-vapour proof sealed enclosures with adequate amounts of desiccant.

.3 Marking:

- .1 Each package shall be identified with the following:
 - .1 Item number and manufacturer's identification and part number;

- .2 Quantity as per Purchase Order unit of measure;
 - .3 Number of packages associated with the packing slip contents;
 - .4 Ship to Location and final destination.
 - .2 Marking should be appropriate for long term storage if required.
- .4 Shipping documentation:
 - .1 Shipping documentation must accompany all deliveries and include as a minimum a packing list itemizing the contents of the consignment to enable a check of ordered versus delivered Products.
 - .2 All documents are to be securely attached to the outside of the packaged items in a weather resistant sealed envelope.
 - .3 A packing list shall contain no less than the following information:
 - .1 Purchase order number;
 - .2 Tag/equipment number (if applicable);
 - .3 Supplier's name;
 - .4 Final destination;
 - .5 Quantity of items;
 - .6 Description of the contents;
 - .7 Supplier reference number.
- .5 Hazardous and dangerous materials:
 - .1 The Supplier must apply the proper warning labels and markings to the hazardous and dangerous goods.
 - .2 The appropriate Safety Data Sheets (SDS) must accompany the shipment and transportation must be in accordance with the relevant standard and/or legislation.
- .6 Air shipments:
 - .1 Goods that are to travel via air transportation must be packed according to International Air Transport Authority (IATA) regulations.

.7 Pre-shipment notification:

- .1 Where special manual handling equipment is required at the receiving site; the Supplier must notify Contractor at the time of the order receipt or within four (4) weeks of the expected arrival date of the requirements.

.8 Product handling:

- .1 Schedule early delivery of Products to enable work to be executed without delay. Before delivery, arrange for receiving at site.
- .2 Deliver and store Products at site where directed by the Contractor.
- .3 Deliver packaged Products, and store until use, in original unopened wrapping or containers, with manufacturer's seals and labels intact.
- .4 Product handling requirements may be repeated, and additional requirements specified, in other Sections of the Specifications.

1.5 Timber boxes, crates and skids

- .1 The design of timber boxes and crates shall be in accordance with ASTM D5118.
- .2 In addition, the Supplier shall ensure that all boxes and crates are either weatherproof lined or that the goods are weatherproofed prior to packing.
- .3 Timber boxes, crates and skids are to be steel strapped and the straps are to be secured with crimped steel seals. Non-metallic strapping shall only be used on cartons or packages packed within the boxes or crates.
- .4 Three-way corner construction reinforced with diagonals shall be used for all crates that are not plywood sheathed. Large crates must bear great superimposed loads. Top strength should be ensured through the use of frequent (not more than 1m apart) top joists. When sheathed, joists shall be placed under the sheathing. Joist supports are to be provided directly under the joist ends.
- .5 For the purpose of lifting by forklift all boxes, crates and skids must be fitted with bearers having a height of no less than 100 mm high and 150 mm wide. Bearers are to permit forklift tine access from two opposite sides.

- .6 Screws not nails should be used when sealing timber crates.

1.6 Support saddles

- .1 Where support saddles are required for the transportation of goods such as vessels, columns and exchangers they shall be designed and incorporate the following:
 - .1 Saddles shall be designed for the purpose of transporting the Goods and transport drawings shall be submitted for review.
 - .2 Where appropriate steel wrapper plates shall be supplied to distribute the load and protect the saddles.
 - .3 Saddles shall be fitted with lifting lugs and supplied with a steel rope or flat metal strapping to secure the saddle to the goods during lifting or transport.
 - .4 Subject to the transport configuration and design requirements, saddles may be either of timber or steel construction.

1.7 Freight containers

- .1 Freight containers are to be used in accordance with the following standards:
 - .1 ASTM D4728, Standard Test Method for Random Vibration Testing of Shipping Containers
 - .2 ASTM D6179, Standard Test Methods for Rough Handling of Unitized Loads and Large Shipping Cases and Crates
 - .3 ASTM D642, Standard Test Method for Determining Compressive Resistance of Shipping Containers, Components, and Unit Loads
 - .4 ASTM D4169, Standard Practice for Performance Testing of Shipping Containers and Systems
- .2 All container movements must be accompanied by a valid container weight declaration (CWD).
- .3 The CWD must contain the following information:
 - .1 The weight of the container (including its contents);
 - .2 The container number and other details to identify the container;

- .3 The name and business name or details necessary to identify the container;
- .4 The date of the declaration;
- .5 And any other information required by the regulations (Example: DG Class, UN number etc.).

1.8 International shipping documents

- .1 The Supplier shall provide commercial invoice, packing list and certificate of origin for international shipping and customs clearance purposes.
- .2 The commercial invoice shall contain the following as a minimum:
 - .1 Date of invoice;
 - .2 A discrete identification of "invoice" number;
 - .3 Shipper name and address; consignee name and address;
 - .4 Show complete SELLER and SOLD TO company names and addresses;
 - .5 Typed or machine printed in English;
 - .6 Full description of the goods; not to use of "Lot" or Miscellaneous"; include tag number if applicable;
 - .7 Minimum first six digits of harmonized tariff code;
 - .8 Purchase order number;
 - .9 Shipping Control Number (SCN) if assigned by the BUYER;
 - .10 Unit cost; quantity shipped; total cost; currency used;
 - .11 Country of origin of the goods.

2 Products – not used

3 Execution – not used

End of section

1 General

1.1 Summary

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

1.2 Construction facilities - general

- .1 Construct temporary Work of new materials unless otherwise approved.
- .2 Prepare shop drawings and specifications of temporary Work and submit for approval of authorities having jurisdiction if so required. Provide an electronic copy to Consultant for their information.
- .3 Locate temporary facilities where shown on Drawings, or as coordinated with the facility operators, subject to the satisfaction of the Consultant.

1.3 Falsework

- .1 Provide and maintain required shoring and bracing in accordance with applicable provincial and local construction safety regulatory requirements and other applicable regulations.
- .2 Design and construct falsework in accordance with CSA S269.1-1975.
- .3 All shoring and related support structures and systems shall be designed, constructed, and installed in accordance with applicable provincial and local governmental regulatory requirements.
- .4 Shoring or related support structures or systems in excess of a height of 1.2m (4'-0") shall be constructed and installed in accordance with Drawings bearing the seal and signature of a Professional Engineer licensed to practice in the Province in which the Work is located.

1.4 Site offices

- .1 Provide a temperature controlled and ventilated office, with suitable lighting, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
- .2 Site office:
 - .1 Provide minimum 10 square metres of temporary office space within site office.
 - .2 Provide at least one operable window and a lockable door.
 - .3 Provide office with temperature control, ventilation, and suitable power and lighting.
 - .4 Provide washroom facilities adjacent to office for site office exclusive use.
 - .5 Equip office with table and chairs to accommodate at least 4 meeting attendees, one 3-drawer filing cabinet.
 - .6 Provide internet access via wi-fi, photocopier and scanner.
 - .7 Provide bi-weekly cleaning service.
 - .8 Remove temporary facilities and controls at the conclusion of the Work, unless otherwise directed by Consultant.
 - .9 Site to be left in tidy and clean condition after removal of all temporary facilities.

1.5 Storage sheds

- .1 Storage areas are as designated by the Owner. Store materials to ensure the preservation of their quality and fitness for the Work.
- .2 Store materials on wooden platforms or other hard, clean surfaces off the ground or in a watertight storage shed of sufficient size for the storage of materials that might be damaged by storage in the open. Provide the shed with a wood floor raised a minimum of 150mm (6") clear of the ground.
- .3 Store materials to ensure the preservation of their quality and fitness for the Work. Store materials on wooden platforms or other hard, clean surface off the ground. Locate stored materials to facilitate prompt inspection.

- .4 If working or storage areas in addition to areas provided at the Place of the Work are required, the Contractor shall be responsible for making arrangements to obtain such additional areas, whether adjacent to the Place of the Work or not, and for obtaining all permits and making rental payments that may be required for such additional areas.
- .5 Provide weathertight heated storage sheds with raised floors for the storage of equipment, as required by the Consultant and/or equipment manufacturers. Provide all storage instructions from equipment Suppliers well in advance of the scheduled delivery dates.
- .6 Handle and store Products in a manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions.
- .7 Store packaged or bundled Products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in the Work.
- .8 Store Products subject to damage from weather in weatherproof enclosures.
- .9 Store cementitious Products clear of earth or concrete floors, and away from walls.
- .10 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .11 Store sheet materials, lumber, etc. on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .12 Store and mix paints in a heated and ventilated room. Remove oily rags and other combustible debris from the site daily. Take every precaution necessary to prevent spontaneous combustion.
- .13 Remove and replace damaged Products to the satisfaction of the Consultant.
- .14 Do not use private property for storage purposes without the written permission of the property owner. Pay rental charges and damages associated with occupying private lands.

1.6 Sanitary facilities

- .1 Sanitary facilities may be used on site.

1.7 Construction aids

- .1 Scaffolding:
 - .1 Each Subcontractor shall provide his own scaffolding.
 - .2 Scaffolding shall be erected clear of walls, and to ensure that it does not interfere with continuing Work.
 - .3 Design, construct, install, inspect, and dismantle scaffolding in accordance with applicable provincial and local governmental regulatory requirements and requirements of CAN/CSA S269.2.
 - .4 Subcontractor shall be responsible for its examination for sufficiency of his scaffolding and be responsible for accidents due to its insufficiency.
 - .5 The Contractor will be responsible for co-ordination of scaffold Work if multiple trade usage can be achieved from one installation.

1.8 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.

1.9 Pest control

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

1.10 Project identification signs

- .1 Provide Project identification signage with graphics and text that indicate name of Project, name and logo of Owner, Subconsultants, Contractor, and major Subcontractors.
- .2 Project identification signs shall be of wood frame and plywood construction with graphics produced by a professional sign company.
- .3 Submit Shop Drawing for Project identification sign graphics and text.
- .4 Erect signs within fifteen (15) Working Days of Contract award in locations directed or approved by Consultant.
- .5 No other signs or advertisements, other than safety, warning, or directional signs, are permitted without Consultant's prior approval.
- .6 Remove all notices on completion of the Contract.

2 Products – not used

3 Execution – not used

End of section

1 General

1.1 Summary

- .1 The Work of this Section includes, but is not limited to the following:
 - .1 Access to site.
 - .2 Temporary parking for construction personnel.
 - .3 Fire routes.

1.2 Access to site

- .1 Do not obstruct entrances, stairs or fire exits.
- .2 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to the Work.
- .3 Maintain vehicular access to all properties within and adjacent to the Place of the Work at all times except when Contractor's operations reasonably necessitate a temporary restriction. Such restrictions shall be kept to a minimum and shall be coordinated with the affected property owner or occupant.
- .4 Plan and schedule the routes of vehicles transporting all materials to, from or within the Place of the Work, so that vehicular movements are accomplished with minimum interference and interruptions to traffic.
- .5 The Owner reserves the right to alter or reject proposed delivery and trucking routes as considered necessary. The Contractor shall notify Suppliers of materials and equipment of the above requirements.

1.3 Temporary parking for construction personnel

- .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 Parking for will be permitted on site provided it does not disrupt performance of Work and continuing operation of the facility.
- .3 The Owner and their employees will not be responsible for parking fines incurred by the Contractor, Subcontractors, Suppliers and/or their employees.

- .4 Provide and maintain adequate access to project site.
- .5 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.
- .6 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

1.4 Fire routes

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

2 Products – not used

3 Execution – not used

End of section

1 General

1.1 Summary

- .1 The Work of this Section includes, but is not limited to the following:
 - .1 Product options
 - .2 Product handling
 - .3 Storage and protection
 - .4 Scheduling of Product delivery
 - .5 Defective Products and Work
 - .6 Specified Products
 - .7 Manufacturer's instructions
 - .8 Workmanship

1.2 Product options

- .1 Subject to the provisions of Section 01 25 00:
 - .1 Wherever a Product or manufacturer is specified by a single proprietary name, provide the named Product only.
 - .2 Wherever more than one Product or manufacturer is specified by proprietary name for a single application, provide any one of the named Products.
- .2 Wherever a Product is specified by reference to a standard only, provide any Product that meets or exceeds the specified standard. If requested by Owner, submit information verifying that the proposed Product meets or exceeds the specified standard.
- .3 Wherever a Product is specified by descriptive or performance requirements only, provide any Product that meets or exceeds the specified requirements. If requested by Owner, submit information verifying that the proposed Product meets or exceeds the specified requirements.
- .4 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.

- .5 All Products and materials supplied shall have a low V.O.C. rating.
- .6 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.
- .7 Unless otherwise specified, maintain uniformity of manufacture for like items throughout.
- .8 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.
- .9 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.
- .10 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.
- .11 Do not install permanently incorporated labels, trademarks and nameplates, in visible locations unless required for operating instructions or by authorities having jurisdiction.

1.3 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, as indicated in Section 01 45 43.

1.4 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 cleaning. Protection shall be easily removable under Section 01 74 00, without damage to finishes.
- .3 Store manufactured Products in accordance with manufacturers' instructions.
- .4 Comply with the requirements of the workplace hazardous materials information system (WHMIS) regarding use, handling, storage, and disposal of hazardous materials, including requirements for labeling and the provision of safety data sheets (SDS).
- .5 Store steel, lumber, masonry units, and similar Products on platforms raised clear of ground.
- .6 Store finished Products and woodwork under cover at all times.
- .7 Do not store Products at locations or in such a manner that they damage previously completed Work.
- .8 Storage and special protection requirements may be repeated and additional requirements specified, in other Sections.

1.5 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 Suppliers.
- .3 Immediately inform the Owner 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 Contractor to ensure delivery dates given are true and accurate.

1.6 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.
- .4 Previous inspection and payment shall not relieve the Contractor from the obligation of providing sound and satisfactory Work in compliance with the Specifications.
- .5 Testing and retesting of any part of the Work as directed by the Owner, Owner or Contractor to establish its conformance to the Contract Documents shall be performed at no addition to the Contract Price.

1.7 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.
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- .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 technical trade Sections. 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

Owner 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 Owner 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 Owner of defects in the Work or departures from intent of Contract Documents that may occur during construction. Owner 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 Owner 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 Owner 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 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 Owner, whose decision is final.

End of section

1 General

1.1 Summary

- .1 Except where otherwise specified in technical trade Sections or otherwise indicated on Drawings, comply with requirements of this Section.
- .2 The Work of this Section includes, but is not limited to the following:
 - .1 Concealment;
 - .2 Fastenings;
 - .3 Location of fixtures;
 - .4 Examination;
 - .5 Structural alignment reports;
 - .6 Protection of completed Work;
 - .7 Installation tolerances;
 - .8 Starting and adjusting;
 - .9 Remedial and defective Work;
 - .10 Cold weather working.

1.2 Manufacturer's instructions

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

1.3 Concealment

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

1.4 Fastenings - general

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials.
- .2 Prevent electrolytic action and corrosion between dissimilar metals and materials by using suitable non-metallic strips, washers, sleeves, or other permanent separators to avoid direct contact.
- .3 Use non-corrosive fasteners and anchors for securing exterior Work and in spaces where high humidity levels are anticipated.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage.
- .5 Keep exposed fastenings to a minimum, spaced evenly, install neatly, and in an organized pattern. Provide exposed metal fastenings of same material, texture, colour and finish as metal on which they occur.
- .6 Do not use fastenings or fastening methods that may cause spalling or cracking of material to which anchorage is made.
- .7 Use only approved driven fasteners.
- .8 At fastenings that penetrate metal roof deck, ensure that penetrations are sealed airtight with approved sealant.
- .9 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.

1.5 Fastenings - equipment

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
 - .1 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
 - .2 Bolts may not project more than one diameter beyond nuts.
 - .3 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.
 - .1 Anchors for systems, pipes, conduits and equipment, hangers and support systems, and connections to building structure shall be the responsibility of the installing Subcontractor.
 - .2 Retain a professional engineer registered in Province of the Work to review/design anchor installation to ensure that all anchors and attachments to the structure are suitable for the purposes intended.
 - .4 Submit proof of load carrying capacity for standard anchors and hanger supports used in construction when requested by the Owner or Contractor.
- .2 Do not use powder actuated tools on site without prior written authorization from Owner. Comply with requirements of the local Occupational Health and Safety Act, general safety regulations when powder actuated tools are used.

1.6 Location of fixtures, outlets and devices

- .1 Consider location of fixtures, outlets, and devices indicated on Drawings as approximate.
- .2 Locate fixtures, outlets, and devices to provide minimum interference, maximum usable space, and as required to meet safety, access, maintenance, acoustic, and regulatory, including barrier free, requirements.

- .3 Promptly notify Owner in writing of conflicting installation requirements for fixtures, outlets, and devices. If requested, indicate proposed locations and obtain approval for actual locations.
- .4 Electrical conduit (and other piping) shall not be run on top of roof decks or within concrete toppings of floors, except where specifically shown.

1.7 Examination

- .1 Examine site and ensure that each trade 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, and are reported to the Owner's Representative and Owner upon discovery, so that the Owner is not restricted in their use of the premises.
- .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 Where new Work is affected by existing Work already completed, take site dimensions of existing Work before commencing incorporation of new Work.

- .2 Before commencing installation of Work, verify that its layout is accurate 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 SI (metric), with Imperial measurements in brackets.
- .5 Installation:
 - .1 Locate Work and components of the Work accurately, in correct alignment and elevation.
 - .2 Make vertical Work plumb and make horizontal Work level.
 - .3 Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - .4 Conceal pipes, ducts, and wiring in finished areas, unless indicated specifically as being exposed as architectural features:
 - .1 In rooms or areas having no finished ceiling; pipes, conduits and ducts will generally be left exposed, except where indicated on the Mechanical Drawings as built into walls or behind furring. Electrical conduit and fittings shall be built into walls.
 - .2 In the event of conflicts occurring between equipment shown in concealed areas, the following order of priority shall be observed:
 - .1 Structural elements;
 - .2 Plumbing drains;
 - .3 Sprinkler piping;
 - .4 Ductwork;
 - .5 Heating piping;

- .6 Plumbing piping;
 - .7 Electrical conduit.
 - .3 Maintain minimum headroom clearance of 2440mm (8') in spaces without a suspended ceiling.
- .5 Underside of structure: Underside of structure is defined to mean the underside of roof decking or floor slab and as follows:
 - .1 Horizontal structures supporting roof decking and floor slab are required to penetrate vertical elements and partitions.
 - .2 Provide sufficient clearance around penetrating components; such as beams, joists, purlins and similar horizontal components to account for structural deflection and packing of ancillary materials required for the following:
 - .1 Fire rating;
 - .2 Smoke separation;
 - .3 Acoustic separation;
 - .4 Environmental separation;
 - .5 Other conditions requiring separation between two adjacent spaces.
- .6 Install Products in accordance with manufacturer's written instructions and recommendations; notify Owner of any modifications or adjustments to installation requirements where project conditions differ from manufacturer's written instructions.
- .7 Install Products at the time and under conditions that will ensure the best possible results. Maintain conditions required for Product performance until Substantial Performance.
- .8 Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- .9 Do not use tools or equipment that produce harmful noise levels unless appropriate Personal Protection Equipment and safety instructions to personnel have been provided, as indicated in Section 01 35 43.
 - .1 Notify adjacent properties where tools or equipment having harmful noise levels will be in use.

- .2 Schedule use of equipment having harmful noise levels at a time that will cause the least disturbance to adjacent properties.
- .10 Be responsible for obtaining manufacturer's literature and for correct roughing-in and hook-up of all equipment, fixtures and appliances, as required.
- .11 Inform the Owner of impending installation of fixtures, switches and attachments and confirm actual locations prior to final installation:
 - .1 Location of fixtures, apparatus or outlets shown or specified shall be considered as approximate only. The actual location shall be as directed and required to suit conditions at the time of installation as defined by Owner.
 - .2 Locations noted on Drawings are diagrammatic only.
 - .3 Note furring requirements and limitations shown on the Drawings.
 - .4 Make allowance for the possibility that indications and locations shown on mechanical and electrical Drawings are diagrammatic.
 - .5 Inform the Owner before any masonry, concrete forming, or installation Work is carried out where the Contractor determines that furring allowances described above cannot be obtained.
- .12 Inform the Owner before proceeding with the Work where the location of holes in the structure could affect the nature or strength of the structure.

1.8 Protection of completed Work and Work in progress

- .1 Adequately protect the Work at all stages and maintain the protection until the Work is completed. Remove and replace any Work and materials damaged that cannot be satisfactorily repaired at no extra cost.
- .2 Promptly remove, replace, clean, or repair, as directed by Owner, Work damaged as a result of inadequate protection.
- .3 Do not load or permit to be loaded any part of the Work with a weight or force that will endanger the safety or integrity of the Work.
- .4 Erect suitable safety barriers as required for security and to make the site safe for pedestrians.
- .5 Supply and erect temporary hoarding and barricades where required. Provide a temporary hoarding plan.

- .6 Remove the barriers from the site at the completion of the Work or when directed by the Owner.
- .7 Motorized equipment shall be powered electrically or by battery only. Internal combustion powered equipment shall not be permitted within construction areas unless approved in writing by the Owner.

1.9 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.

1.10 Starting and adjusting

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

1.11 Remedial Work

- .1 Notify Owner of, and perform remedial Work required to, repair or replace defective or unacceptable Work.

- .2 Ensure that properly qualified workers perform remedial Work. Coordinate adjacent affected Work as required.

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 Owner 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.
- .2 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 Owner's opinion, the Work may be acceptable.
- .3 All testing shall be conducted in accordance with the requirements of the Owner.
- .4 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 it has been previously inspected.
- .5 If rejected, defective materials or Work incorporating defective materials or workmanship shall be promptly removed and replaced or repaired to the satisfaction of the Owner, at no expense to the Owner.

1.13 Work on public property

- .1 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 Owner.
- .2 Include curb cuts and making good of existing property to provide fully paved and finished approaches to requirements of Authorities having Jurisdiction.
- .3 Include making good of existing curbs, walks, paving and soft landscaping on adjacent property.

2 Products – not used

3 Execution – not used

End of section

1 General

1.1 Summary

- .1 The Work of this Section includes, but is not limited to the following:
 - .1 Request for cutting
 - .2 Definitions
 - .3 Products
 - .4 Preparation
 - .5 Cutting, patching and remedial Work
 - .6 Performance

1.2 Request for cutting, patching and remedial Work

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

1.3 Definitions

- .1 Cutting: Removal of existing construction necessary to permit installation or performance of other Work.
- .2 Patching: Fitting and repair Work required to restore surfaces to original conditions after installation of other Work.

1.4 Products

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

1.5 Preparation

- .1 Inspect existing conditions and report any discrepancies between on site conditions and drawings to the Owner for direction.
- .2 Provide supports to ensure structural integrity of surroundings; provide devices and methods to protect other portions of the Work from damage.
- .3 Provide protection from elements for areas that may be exposed by uncovering Work.

1.6 Cutting, patching, and remedial Work

- .1 Coordinate and perform the Work to ensure that cutting and patching Work is kept to a minimum.
- .2 Perform cutting, fitting, patching, and remedial work to make the affected parts of the Work come together properly and complete the Work.
- .3 Provide openings in non-structural elements of the Work for penetrations of mechanical and electrical Work.
- .4 Perform cutting by methods to avoid damage to other Work.
- .5 Provide proper surfaces to receive patching, remedial Work, and finishing.

- .6 Perform cutting, patching, and remedial Work using competent and qualified specialists familiar with the Products affected, in a manner that neither damages nor endangers the Work.
- .7 Do not use pneumatic or impact tools without Owner's prior approval.
- .8 Ensure that cutting, patching, and remedial Work does not jeopardize manufacturers' warranties.
- .9 Refinish surfaces to match adjacent finishes. For continuous surfaces refinish to nearest intersection. For an assembly, refinish entire unit.
- .10 Fit Work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces with suitable allowance for deflection, expansion, contraction, acoustic isolation, and firestopping.
- .11 Maintain fire ratings of fire rated assemblies where cutting, patching, or remedial Work is performed. Completely seal voids or penetrations of assembly with firestopping material to full depth or with suitably rated devices.
- .12 Structural elements: Do not cut and patch structural elements in a manner that could change their load carrying capacity or load deflection ratio.
- .13 Operational elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety, including but not limited to the following:
 - .1 Primary operational systems and equipment;
 - .2 Air or smoke barriers;
 - .3 Fire protection systems;
 - .4 Control systems;
 - .5 Communication systems;
 - .6 Conveying systems;
 - .7 Electrical wiring systems.
- .14 Miscellaneous elements: Do not cut and patch the following elements or related components in a manner that could change their load carrying capacity, that results in reducing their capacity to perform as intended, or

that result in increased maintenance or decreased operational life or safety, including but not limited to the following:

- .1 Equipment supports;
 - .2 Piping, ductwork, vessels, and equipment;
 - .3 Noise and vibration control elements and systems.
- .15 Visual requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching.
- .16 Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Owner's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- .17 If possible, retain original Installer or fabricator to cut and patch exposed Work listed below. If it is impossible to engage original Installer or fabricator, engage another recognized, experienced, and specialized firm, including but not limited to the following:
- .1 Firestopping and smoke seals;
 - .2 Finished flooring;
 - .3 Finished coatings;
 - .4 Wall coverings;
 - .5 HVAC enclosures, cabinets, or covers.
- .18 Tooth new masonry Work into existing masonry when installed in the existing building.
- .19 Cutting and patching conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.7 Performance

- .1 Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay:
 - .1 Cut existing construction to provide for installation of other components or performance of other construction, and

subsequently patch as required to restore surfaces to their original condition.

- .2 Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction.
 - .1 In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - .2 Existing finished surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - .3 Concrete or masonry: Cut using a cutting machine, such as an abrasive saw or a diamond core drill.
 - .4 Mechanical and electrical services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - .5 Proceed with patching after construction operations requiring cutting are complete.
- .3 Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible.

2 Products – not used

3 Execution – not used

End of section

1 General

1.1 Summary

- .1 The Work of this Section includes, but is not limited to the following:
 - .1 Definitions;
 - .2 Submittals;
 - .3 General cleaning requirements;
 - .4 Progressive cleaning requirements;
 - .5 Cleaning prior to completion;
 - .6 Diversion of materials.

1.2 Definitions

- .1 Alternative daily cover: Material (other than earthen material) that is placed on the surface of the active face of municipal solid waste landfills at the end of each Working Day to control vectors, fires, odours, blowing litter, and scavenging.
- .2 Biomass: Plant material from trees, grasses, or crops that can be converted to heat energy to produce electricity.
- .3 Construction and demolition debris: Includes waste and recyclables generated from construction and from the renovation, demolition, or deconstruction of pre-existing structures. It does not include hazardous materials or land-clearing debris, such as soil, vegetation, and rocks.
- .4 Eligible biofuels: Untreated wood waste, agricultural crops or waste, landfill gas, animal waste and other organic waste.
- .5 Hazardous materials: As defined by relevant regulations in the location of the project. Hazardous materials should be excluded from calculations and should be disposed of according to relevant regulations.
- .6 Incineration facilities: Waste management operations that use combustion as a means of reducing the volume of waste materials.
- .7 Recycling: The collection, reprocessing, marketing, and use of materials that were diverted or recovered from the solid waste stream.

- .8 Reuse: The return of materials to active use in the same or a related capacity as their original use, thus extending the lifetime of materials that would otherwise be discarded.
- .9 Tipping fees: Charged by a landfill for disposal of waste, typically quoted per tonne.

1.3 Submittals

- .1 Submit end-use confirmation documentation electronically as part of closeout submittals, as indicated in Section 01 78 00.
 - .1 Confirmation from recycling and/or reuse facilities of the destination and end use for each material diverted from landfills.
 - .1 Signed letters provided by recycling and/or reuse facilities, including:
 - .1 Municipal addresses of receiving facilities;
 - .2 Process or method used of recycling the material (melting, crushing, chipping);
 - .3 Intended use of each type of material received.

1.4 General cleaning requirements

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

1.5 Progressive cleaning and waste management

- .1 Maintain the Work in a tidy and safe condition, free from accumulation of waste materials and construction debris.
- .2 Provide appropriate, clearly marked, containers for collection of waste materials and recyclables. Locate containers where indicated on Drawings, or where identified by the Owner.

- .3 Remove waste materials and recyclables from Work areas, separate, and deposit in designated recycling containers at end of each Working Day. Collect packaging materials for recycling or reuse.
- .4 Remove waste materials and recyclables from Place of the Work weekly. Increase removal where required to ensure the site is left in a clean and tidy state.
- .5 Ensure that spatters, droppings, soil, labels and debris are removed from the surfaces to receive finishes, before they set up. Leave Work and adjacent finished Work in new condition to the satisfaction of the Owner.
- .6 Use only cleaning materials which are recommended for the purpose by both the manufacturer of the surface to be cleaned and of the cleaning material.
- .7 Maintain areas "broom clean" at all times during the Work. Vacuum clean interior areas immediately before finish painting commences.
- .8 Do not burn or bury waste material at the site unless otherwise instructed or approved, in writing, by the Owner.
- .9 Do not allow waste material and/or debris to accumulate in an unsatisfactory or hazardous manner. Sprinkle dusty accumulations with water.
- .10 Each Section shall supply the Contractor with instructions for final cleaning of their Work, for inclusion in O&M manual indicated in Section 01 78 00.
- .11 Clean interior building areas prior to start of finish Work and maintain free of dust and other contaminants during finishing operations.
- .12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly finished surfaces nor contaminate building systems.

1.6 Cleaning prior to completion

- .1 Before final cleaning, arrange a meeting at Place of the Work to determine the acceptable standard of cleaning. Ensure that Owner, Contractor and cleaning company (where applicable) are in attendance.

- .2 Remove from Place of the Work surplus Products, waste materials, recyclables, temporary Work, and construction equipment not required to perform any remaining Work.
- .3 Lock or otherwise restrict access to each room or area after completing final cleaning in that area.
- .4 Re-clean as necessary areas that have been accessed by Contractor's workers prior to Owner occupancy.
- .5 Remove stains, spots, marks, and dirt from finished surfaces, electrical and mechanical fixtures, furniture fitments, walls, floors and ceilings.
- .6 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and all other finished surfaces. Replace broken, scratched or otherwise damaged glass.
- .7 Remove dust from lighting reflectors, lenses, lamps, bulbs, and other lighting surfaces.
- .8 Vacuum clean and dust exposed wall, floor, and ceiling surfaces, behind grilles, louvres and screens.
- .9 Clean mechanical, electrical, and other equipment. Replace filters for mechanical equipment if equipment is used during construction.
- .10 Remove waste material and debris from crawlspaces and other accessible concealed spaces.
- .11 Clean interior window glass and frames.

2 Products – not used

3 Execution

3.1 Diversion of materials

- .1 Recycle and/or salvage non-hazardous construction and demolition debris excluding land-clearing debris such as soil and rocks.
 - .1 Prevent contamination of materials for reuse and recycling by handling in accordance with requirements for acceptance by designated facilities.

- .2 Separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Owner, and consistent with applicable fire regulations.
 - .1 A project may choose to separate construction waste on-site or have commingled construction waste sorted at an off-site facility.
 - .1 On-site separation provides immediate feedback of the ongoing waste diversion efforts but may require additional labour.
 - .2 Commingled recycling simplifies the waste management effort on-site. This option is especially useful for projects with tight space constraints and no room for multiple collection bins.
- .3 Work with manufacturer's to minimize unnecessary packaging and making arrangements for pallets to be reclaimed after use can also reduce waste volumes and waste management costs.
- .4 The Contractor must identify on-site recycling locations and review recycling requirements with all Subcontractors.
- .5 Recommended construction and demolition waste diversion shall be as follows:
 - .1 Minimum 75% diversion from landfill:
 - .1 Concrete;
 - .2 Asphalt;
 - .3 Clean rubble;
 - .4 Cardboard;
 - .5 Standard gypsum board (unpainted);
 - .6 Clean lumber;
 - .7 Glass;
 - .8 All metals (aluminum, steel, iron, copper).
- .6 Transportation of waste:
 - .1 Transport all separated reusable, recyclable or disposable construction and/or demolition waste materials to approved recycling or disposal facilities.

- .7 Disposal of waste:
 - .1 Do not bury rubbish or waste materials.
 - .2 Do not dispose of any waste into waterways, storm or sanitary sewers.
 - .3 Keep records of construction waste including:
 - .1 Number and size of bins;
 - .2 Waste type of each bin;
 - .3 Total tonnage generated;
 - .4 Re-used or recycled waste destination.
- .8 Cleaning:
 - .1 Remove tools and waste materials on completion of Work and leave Work area in clean and orderly condition.
 - .2 Clean up Work area as Work progresses.
 - .3 Source separate materials to be reused/recycled into specified sort areas.

End of section

1 General

1.1 Summary

- .1 The Work of this Section includes, but is not limited to the following:
 - .1 Inspection and review before takeover
 - .2 Final payment prerequisites
 - .3 Partial user occupancy
 - .4 Substantial Performance of the Work

1.2 Ready-for-takeover

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

1.3 Inspection and review before takeover

- .1 Contractor's inspection: Before applying for the Owner's review to establish Ready-for-Takeover:
 - .1 Ensure that the specified prerequisites to Ready-for-Takeover milestone are completed.
 - .2 Conduct an inspection of the Work to identify defective, deficient, or incomplete Work.
 - .3 Prepare a comprehensive and detailed list of items to be completed or corrected.
 - .4 Provide an anticipated schedule and costs for items to be completed or corrected.
- .2 Owner's review: Upon receipt of the Contractor's application for review, together with the Contractor's list of items to be completed or corrected, the Owner and the Contractor shall arrange a mutually satisfactory agreed date and time to jointly review the Work. The Owner will advise the Contractor whether or not the Work is Ready-for-Takeover. Add additional items, if any, to the Contractor's list of items to be completed or corrected. Provide the Owner with a copy of the revised list.
- .3 Maintain the list of items to be completed or corrected and promptly correct or complete defective, deficient and incomplete Work. The

Contractor's inspection and Owner's review procedures specified above shall be repeated until the Work is Ready-for-Takeover and no items remain on the Contractor's list of items to be completed or corrected.

- .4 When the Owner determines that the Work has meet the Ready-for-Takeover requirements outlined in the Project Manual, the Owner will notify the Contractor and the Owner in writing to that effect.

1.4 Prerequisites to final payment

- .1 After Ready-for-Takeover milestone has been achieved, and before submitting an application for final payment in accordance with the General Conditions of Contract, do the following:
 - .1 Correct or complete all remaining defective, deficient, and incomplete Work;
 - .2 Remove from the Place of the Work all remaining surplus Products, Construction Equipment, and temporary Work;
 - .3 Perform final cleaning and waste removal necessitated by the Contractor's Work performed after Ready-for-Takeover, as specified in Section 01 74 00.

1.5 Partial user occupancy

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

1.6 Substantial Performance of the Work

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

2 Products – not used

3 Execution – not used

End of section

1 General

1.1 Summary

- .1 The Work of this Section includes, but is not limited to the following:
 - .1 Operation and maintenance manual (O&M) format, content, Product and finishes content and warranties content.
 - .2 Contractor's as-built Drawings
 - .3 Project record Drawings
 - .4 Spare parts, maintenance materials, and special tools.

1.2 Operation and maintenance (O&M) manual

- .1 Prepare a comprehensive operation and maintenance (O&M) manual, in the language(s) of the Contract, using personnel qualified and experienced for this task.
- .2 Submit an initial draft of the O&M manual for Owner's review. If required by Owner's review comments, revise manual contents and resubmit for Owner's review. If required, repeat this process until Owner accepts the draft manual in writing.
- .3 Submit final version to Owner in electronic format, as indicated below.
- .4 Operation and maintenance (O&M) manual - format:
 - .1 Organize data in the form of an instructional manual and provide an electronic copy of the O&M manual in .pdf format.
 - .2 Title page: Identify the title "Operation and Maintenance Manual", name of Project or facility, and subject matter of contents.
 - .3 Arrange content by systems, under Section name and numbers, as sequenced within the Table of Contents of the Specifications.
 - .4 Text: Arial size 10 or 11 font for typed data.
 - .5 Drawings: Provide in .pdf format.
 - .6 Provide electronic copy of Shop Drawings in manual, scaled to reflect that of the Drawing details; Files in .dwg format on electronic media acceptable to Owner.
- .5 Operation and maintenance (O&M) manual – general content:

- .1 Table of contents for each volume.
- .2 Introductory information including:
 - .1 Date of manual submission;
 - .2 Complete contact information for Owner, Subconsultants, other consultants, and Contractor, with names of responsible parties;
 - .3 Schedule of Products and systems indexed to content of volume.
- .3 For each Product or system, include complete contact information for Subcontractors, Suppliers and manufacturers, including local sources for supplies and replacement parts.
- .4 Product data: mark each sheet to clearly identify specific Products, options, and component parts, and data applicable to installation. Delete or strike out inapplicable information. Supplement with additional information as required.
- .5 Reviewed Shop Drawings.
- .6 Permits, certificates, letters of assurance and other relevant documents issued by or required by authorities having jurisdiction.
- .7 Warranties.
- .8 Operating and maintenance procedures, incorporating manufacturer's operating and maintenance instructions, in a logical sequence.
- .9 Training materials.
- .6 Operation and maintenance (O&M) manual - equipment and systems content:
 - .1 Each item of equipment and each system: Include description of unit or system and component parts.
 - .1 Give function, normal operation characteristics, and limiting conditions.
 - .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
 - .2 Panel board circuit directories: Provide electrical service characteristics, controls, and communications.

- .3 Include installed colour coded wiring diagrams.
- .4 Operating procedures: Include start-up, break-in, and routine normal operating instructions and sequences.
 - .1 Include regulation, control, stopping, shut-down, and emergency instructions.
 - .2 Include summer, winter, and any special operating instructions.
- .5 Maintenance requirements: Include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide installed control diagrams by controls manufacturer.
- .10 Provide original manufacturer's parts list, illustrations, assembly Drawings, and diagrams required for maintenance.
- .11 Provide Contractor's coordination Drawings, with installed colour coded piping diagrams.
- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include testing and balancing reports.
- .15 Include additional content as specified in technical trade Sections.
- .7 Operation and maintenance (O&M) manual - Products and finishes content:
 - .1 Include Product data, with catalogue number, options selected, size, composition, and colour and texture designations.
 - .2 Provide information for re-ordering custom manufactured Products.

- .3 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Include an outline of requirements for routine and special inspections and for regular maintenance to ensure that on-going performance of the building envelope will meet the initial building envelope criteria.
- .5 Include additional content as specified in technical trade Sections.
- .8 Operation and maintenance (O&M) manual - warranties content:
 - .1 Separate each warranty with index tab sheets keyed to Table of Contents listing.
 - .2 List each warrantor with complete contact information.
 - .3 Verify that documents are in proper form and contain full information. Ensure that warranties are for the correct duration and are in Owner's name.

1.3 Spare parts, maintenance materials, and special tools

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

2 Products – not used

3 Execution – not used

End of section

1 General

1.1 Summary

- .1 This Section includes the following:
 - .1 Demolition and removal of selected portions of interior building components and finishes
 - .2 Repair procedures for selective demolition operations
 - .3 Salvage of existing items to be reused or recycled.
- .2 This Section does not include the following:
 - .1 Removal of hazardous materials or asbestos abatement
 - .2 Demolition of exterior building components or structural elements
 - .3 Mechanical or electrical equipment, except as required to make minor modifications to allow the work to be completed
- .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 09 68 13 – Tile Carpeting
- .2 Section 10 21 13 – Toilet Compartments
- .3 Section 22 40 00 – Plumbing Fixtures and Trim

1.3 Definitions

- .1 Demolish: Detach items from existing construction using non-destructive/systematic methods, coordinated to preserve substrates and legally disposed of off-site.
- .2 Remove and Salvage: Detach items from existing construction and deliver them to Owner.
- .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.

1.4 Reference standards

- .1 Occupational Health and Safety Regulations.
- .2 Region Building Rules and Regulations
- .3 All Codes, Laws, and Regulations as applicable.

1.5 Administrative requirements

- .1 Materials Ownership:
 - .1 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.
- .2 Pre-Demolition Meeting: Conduct a pre-demolition meeting at Project site in accordance with requirements listed in Section 01 31 19 – Project Meetings, to confirm extent of salvaged and demolished materials.
- .3 Coordination: Coordinate selective demolition work so that work of this Section adheres to aesthetic criteria established by the Drawings and specified dimensions with all elements in planes as drawn, maintaining their relationships with all other building elements.

1.6 Quality assurance

- .1 Regulatory Requirements: Perform work as follows; use most restrictive requirements where differences occur between the municipal, provincial and federal jurisdictions:
 - .1 Provincial and Federal Requirements: Perform work in accordance with governing environmental notification requirements and regulations of the Authority Having Jurisdiction.
 - .2 Municipal Requirements: Perform hauling and disposal operations in accordance with regulations of Authority Having Jurisdiction.
- .2 Qualifications: Provide proof of qualifications when requested by Consultant:

- .1 Demolition Firm: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project:
 - .1 Conform to provincial occupational health and safety legislation.
 - .2 Conform to Workers' Compensation Board Regulations.
 - .3 Conform to municipal bylaws and regulations governing this type of work.

1.7 Site conditions

- .1 Owner will occupy portions of building immediately adjacent to selective demolition area:
 - .1 Conduct selective demolition so that Owner's operations will not be disrupted.
 - .2 Provide not less than 72 hours notice to Owner of activities that will affect Owner's operations.
- .2 Maintain access to existing means of egress, walkways, corridors, exits, and other adjacent occupied or used facilities.
- .3 Do not close or obstruct means of egress, walkways, corridors, exits, or other occupied or used facilities without written acceptance from authorities having jurisdiction.
- .4 Notify Consultant of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- .5 Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - .1 Hazardous materials will be as defined in the Hazardous Materials Act.
 - .2 Hazardous materials will be removed by Owner before start of the Work.
 - .3 If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Consultant and Owner. Hazardous materials will be removed by Owner under a separate contract or as a change to the Work.

- .6 Storage or sale of removed items or materials on site will not be permitted.
- .7 Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
- .8 Maintain fire-protection facilities in service during selective demolition operations.

2 Products

2.1 Description

- .1 This section of the Work includes, but is not necessarily limited to, the following:
 - .1 Demolition, removal completely from site, and disposal of all identified components, materials, equipment and debris
 - .2 Selective demolition to allow new walls, bulkheads, ceilings and other materials to meet existing construction as indicated
 - .3 All material from demolition shall be removed from site immediately with no salvage, selling, sorting or burning permitted on site

2.2 Debris

- .1 Make all arrangements for transport and disposal of all demolished materials from the site.

2.3 Equipment

- .1 Provide all equipment required for safe and proper demolition of the building interiors indicated.

2.4 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; gypsum based products are not acceptable for work of this Section.
- .3 Gypsum Board Patching Compounds: Joint compound to ASTM C475/C475M, 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 29 13.

3 Execution

3.1 Examination

- .1 Verify that utilities have been disconnected and capped.
- .2 Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- .3 Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- .4 Notify the Consultant where existing mechanical, electrical, or structural elements conflict with intended function or design:
 - .1 Investigate and measure the nature and extent of conflict and submit a written report to Consultant.
 - .2 Consultant will issue additional instructions or revise drawings as required to correct conflict.
- .5 Perform surveys as the work progresses to detect hazards resulting from selective demolition activities.

3.2 Utility services

- .1 Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished.
 - .1 Arrange to shut off affected utilities with utility companies.

- .2 If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary utilities that bypass area of selective demolition and that maintain continuity of service to other parts of building.
- .3 Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
- .4 Cut off pipe or conduit to a minimum of 25 mm below slab, and remove concrete mound.
- .2 Coordinate with mechanical and electrical sections for shutting off, disconnecting, removing, and sealing or capping utilities.
- .3 Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.3 Preparation

- .1 Identify and mark all equipment and materials identified to be retained by Owner or to be re-used in subsequent construction. Separate and store items to be retained in an area away from area of demolition and protect from accidental disposal.
- .2 Post warning signs on electrical lines and equipment that must remain energized to serve other areas during period of demolition.
- .3 Confirm that all electrical and telephone service lines entering buildings are not disconnected.
- .4 Do not disrupt active or energized utilities crossing the demolition site.
- .5 Provide and maintain barricades, warning signs, protection for workmen and the public during the full extent of the Work. Read drawings carefully to ascertain extent of protection required.
- .6 Mark all materials required to be re-used, store in a safe place until ready for re-installation.
- .7 Adjust all junction boxes, receptacles and switch boxes flush with new wall construction where additional layers to existing construction are indicated.

- .8 Remove permanent marker lines used or found on exposed surfaces and at surfaces indicated for subsequent finish materials. Mechanically remove permanent marker lines and associated substrates where permanent marker lines occur and patch surface. Sealing or priming over permanent marker lines is not acceptable.

3.4 Selective demolition

- .1 Demolish and dismantle work in a neat and orderly manner and in strict accordance with all regulations.
- .2 At end of each day's work, leave Work in safe condition so that no part is in danger of toppling or falling.
- .3 Demolish in a manner to minimize dusting and to prevent migration of dust.
- .4 Selling or burning of materials on the site is not permitted.
- .5 Fill all openings in gypsum board walls with gypsum board and steel framing to match existing, skim coat to make wall smooth and even.
- .6 Demolish existing carpet, and adhesive remnants as follows:
 - .1 Refer to Section 01 73 00 – Execution for noise and dust control and use of premises.
 - .2 Vacuum existing carpet thoroughly, prior to removal, using vacuum equipped with power head/sweeper.
 - .3 Apply fine mist water spray to carpet as required to minimize dust generation during removal. Avoid spraying near electrical outlets.
 - .4 Remove adhesive to the greatest extent possible using scrapping tools and as follows:
 - .1 Do not use solvent based cleaners to remove adhesive remnants.
 - .2 Lightly shot blast or grind floor using machine designed for purpose to remove adhesive remnants.
 - .3 Vacuum floor ready for application of skim coating.
 - .4 Repair all slab depressions and damage with cementitious patching compound.

- .5 Skim coat floor with minimum 1 mm thick cementitious floor underlayment compatible with new flooring materials.
- .5 Floor substrate shall be smooth, free from ridges and depressions, and adhesive remnants that could telegraph through resilient flooring materials and carpets.
- .7 Remove all washroom partitions and fixtures scheduled for demolition. Patch and repair wall surfaces with skim coat of gypsum board joint compound leaving wall surfaces smooth and even ready for new wall finishes.
- .8 Patch and repair all walls, floor and ceilings damaged during demolition with material matching adjacent walls, prepare ready for new finishes.
- .9 Patch and repair all mechanical equipment and electrical fixtures damaged or exposed during demolition to match adjacent finished surfaces.

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 a 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 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.
 - .7 Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

- .2 Ceilings: patch, repair, or re-hang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

3.6 Closeout activities

- .1 Cleaning:
 - .1 Promptly as the Work progresses, and on completion, clean up and remove from the site all rubbish and surplus material. Remove rubbish resulting from demolition work daily.
 - .2 Maintain access to exits clean and free of obstruction during removal of debris.
 - .3 Keep surrounding and adjoining roads, lanes, sidewalks, municipal rights-of-way clean and free of dirt, soil or debris that may be a hazard to vehicles or persons.

3.7 Protection

- .1 Prevent debris from blocking drainage inlets and systems and ground draining and protect material and electrical systems and services that must remain in operation.
- .2 Provide and maintain fire prevention equipment and alarms accessible during demolition.

End of section

1 General

1.1 Summary

- .1 This Section includes requirements for supply and installation of non-ornamental metal fabrications and miscellaneous metals required for installation of structural steel, decking and joist framing, and other structural components.

1.2 Related requirements

- .1 Section 06 20 00 – Finish Carpentry and Millwork: Concealed supports for shop finished carpentry.
- .2 Section 09 91 00 – Painting

1.3 Reference standards

- .1 American Society for Testing of Materials (ASTM International):
 - .1 ASTM A27/A27M-17, Standard Specification for Steel Castings, Carbon, for General Application
 - .2 ASTM A36/A36M-14, Standard Specification for Carbon Structural Steel
 - .3 ASTM A108-18, Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
 - .4 ASTM A276/A276M-17, Standard Specification for Stainless Steel Bars and Shapes
 - .5 ASTM A307-14e1, Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
 - .6 ASTM A500/A500M-20, Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
 - .7 ASTM A563-15, Standard Specification for Carbons and Alloy Steel Nuts
 - .8 ASTM A568/A568M-17a, Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled,

- .9 ASTM B221-14, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
- .10 ASTM E488/E488M-18, Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements
- .11 ASTM F593-17, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
- .12 ASTM F594-09 (2015), Standard Specification for Stainless Steel Nuts
- .2 Canadian Standards Association (CSA Group):
 - .1 CAN/CSA S16-14, Limit States Design of Steel Structures
 - .2 CSA G30.18-09(R2014), Carbon Steel Bars for Concrete Reinforcement
 - .3 CSA G40.20-13/G40.21-13 (R2018), General Requirements for Rolled or Welded Structural Quality Steel Structural Quality Steel
 - .4 CSA W47.1-09(R2014), Certification of Companies for Fusion Welding of Steel
 - .5 CSA W55.3-08(R2018), Certification of Companies for Resistance Welding of Steel and Aluminum
 - .6 CSA W59 18, Welded Steel Construction (Metal Arc Welding) with Update
 - .7 CSA W178.1-18, Certification of Welding Inspection Organizations
- .3 Canadian General Standards Board (CGSB):
 - .1 CAN/CGSB 1.40M-97, Primer, Structural Steel, Oil Alkyd Type
 - .2 CAN/CGSB 1.181M-99, Coating, Zinc Rich, Organic, Ready Mixed
- .4 The National Association of Architectural Metal Manufacturers (NAAMM):
 - .1 AMP 555-92, Code of Standard Practice for Architectural Metal Industry, including Miscellaneous Iron

1.4 Administrative requirements

- .1 Pre-Construction Meetings: Schedule and conduct pre-installation conference at project site in accordance with Section 01 31 19 – Project Meetings with Contractor, Subcontractor responsible for fabrication and erection, Subcontractor responsible for finish painting, and Owner to verify project requirements, fabricator's installation instructions and manufacturer's warranty requirements.
- .2 Coordination: Coordinate with for requirements affecting this Section and as follows:
 - .1 Anchorages: Provide setting drawings, templates and directions for installing anchorages including sleeves, concrete inserts, anchor bolts, and items with integral anchors that are embedded in concrete or masonry and deliver to site in time for installation.
 - .2 Architectural Finishing: Coordinate finishing requirements with paint systems specified in Section 09 91 00; failure to apply referenced primer will result in this section removing applied primer and recoating with specified material at no additional cost to Owner.

1.5 Submittals

- .1 Provide required information in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Action Submittals: Provide following submittals before starting any work of this Section:
 - .1 Product Data: Submit product data for following:
 - .1 Non-slip aggregates and non-slip aggregate surface finishes
 - .2 Grout
 - .3 Fasteners
 - .4 Prefabricated components
 - .5 Paint and coating products

- .2 Shop Drawings: Submit shop drawings indicating detailed fabrication and erection of each metal fabrication indicated in accordance with NAAMM AMP 555 including; but not limited to plans, elevations, sections, and details of metal fabrications and connections; show anchorage and accessory items.
- .3 Informational Submittals: Provide following submittals when requested by Owner:
 - .1 Certificates: Submit certificates for following:
 - .1 Mill certificates signed by manufacturers of stainless-steel sheet certifying that products provided are in accordance with requirements of this Section.
 - .2 Copies of welding certificates for welding procedures and personnel.

1.6 Quality assurance

- .1 Qualifications: Provide proof of qualifications when requested by Owner:
 - .1 Fabricators: Use fabricator experienced in producing metal fabrications similar to those required for this project and with record of successful in-service performance with sufficient production capacity to produce required units.
 - .2 Personnel: Use welders qualified by Canadian Welding Bureau for classification of work being performed that are experienced in type and extent of work required for project.

1.7 Site conditions

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

2 Products

2.1 Materials

- .1 Metal Surfaces: Provide materials with smooth, flat surfaces without blemishes for metal fabrications exposed to view in completed Work; do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- .2 Ferrous Metals:
 - .1 Steel Plates, Shapes, and Bars: In accordance with CSA G40.20/G40.21, Grade 300W.
 - .2 Hollow Structural Sections: In accordance with CSA G40.20/G40.21, Grade 350W, Class C.
 - .3 Stainless Steel Sheet, Strip, Plate, and Flat Bars: In accordance with ASTM A666, Type 304.
 - .4 Stainless Steel Bars and Shapes: In accordance with ASTM A276/A276m, Type 304.
 - .5 Steel Tubing: Cold formed steel tubing in accordance with ASTM A500/A500M.
 - .6 Steel Pipe: In accordance with ASTM A53/A53M, standard weight (Schedule 40).
 - .7 Slotted Channel Framing: Cold formed metal channels with flange edges returned toward web and with 14 mm wide slotted holes in webs at 50 mm o/c and as follows:
 - .1 Width of Channels: 41 mm
 - .2 Depth of Channels: 41 mm
 - .3 Metal and Thickness: Galvanized steel in accordance with ASTM A653/A653M, structural quality, Grade 230, with Z275 coating; 2.8 mm nominal core metal thickness.
 - .4 Acceptable Products:
 - .1 Powerstrut Engineering Co., Inc.
 - .2 Tyco Unistrut Corporation
 - .3 Or approved alternate

- .8 Welding Rods and Bare Electrodes: Select according to CWB specifications for metal alloy welded.
- .3 Non-Ferrous Metals:
 - .1 Aluminum Extrusions: In accordance with ASTM B221, alloy 6063-T6.
 - .2 Aluminum Alloy Rolled Tread Plate: In accordance with ASTM B632/B632M, alloy 6061-T6.
- .4 Cementitious Materials:
 - .1 Non-Shrink, Non-Metallic Grout: Factory packaged, non-staining, non-corrosive, non-gaseous grout in accordance with ASTM C1107/C1107M, specifically recommended by manufacturer for interior and exterior applications.
 - .2 Concrete: Provide concrete for normal weight, air entrained, ready mix concrete having minimum 28 day compressive strength of 20 MPa.
- .5 General Fasteners: Provide Type 304 or 316 stainless steel fasteners for exterior use and zinc plated fasteners with coating in accordance with ASTM B633, Class Fe/Zn 5, where built into exterior walls; select fasteners for type, grade and class required and selected from following:
 - .1 Bolts and Nuts:
 - .1 Bolts: Regular hexagon head bolts, ASTM A307, Grade or ASTM F568/F568M, Property Class 4
 - .2 Nuts and Washers ASTM A563/A563M hex nuts and flat washers
 - .2 Anchor Bolts: ASTM F1554, Grade 36.
 - .3 Machine Screws: ASME B18.6.3/B18.6.7M.
 - .4 Plain Washers: Round, carbon steel, ASME B18.22.1/B18.22M.
 - .5 Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1/B18.21.2M.
- .6 Premanufactured Fasteners:

- .1 Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, load equal to six times load imposed when installed in unit masonry and equal to four times load imposed when installed in concrete, as determined by testing in accordance with ASTM E488/E488M, conducted by qualified independent testing agency and as follows:
 - .1 Carbon steel components zinc plated in accordance with ASTM B633, Class Fe/Zn 5
 - .2 Alloy Group 1 or 2 stainless steel bolts in accordance with ASTM F593/ASTM F738M and nuts in accordance with ASTM F594/ASTM F836M
- .7 Finishes: Finish metal fabrications in accordance with NAAMM Metal Finishes Manual for Architectural and Metal Products following recommendations for applying and designating finish after assembly and as follows:
 - .1 Steel and Iron Finishes:
 - .1 Galvanizing: Hot dip galvanize items as indicated in accordance with applicable standard following:
 - .1 Products: ASTM A123/A123M
 - .2 Hardware ASTM A153/A153M
 - .2 Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces in accordance with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
 - .1 Exteriors SSPC Zone 1B: SSPC-SP6, Commercial Blast Cleaning
 - .2 Interiors SSPC Zone 1A: SSPC-SP3, Power Tool Cleaning
 - .2 Applied Finishes: Apply finishes to uncoated surfaces of metal fabrications, except items with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry in accordance with SSPC-PA1, Paint Application Specification No. 1 and as follows:

- .1 Shop Primers: Provide primers that are compatible with paint systems.

2.2 Fabrication

- .1 Shop Fabrication: Shear and punch metals cleanly and accurately, remove burrs; ease exposed edges to radius of approximately 1 mm; form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing work and as follows:
 - .1 Fabricate joints exposed to weather in manner to exclude water, or provide weep holes where water may accumulate.
 - .2 Fabricate assemblies exposed to exterior conditions that allow for thermal movement resulting from ambient and surface temperatures by preventing buckling, opening up of joints, overstressing of components, failure of connections, and other detrimental effects.
 - .3 Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
 - .4 Remove sharp or rough areas on exposed traffic surfaces.
- .2 Shop Welding: Weld corners and seams continuously and as follows:
 - .1 Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - .2 Obtain fusion without undercut or overlap.
 - .3 Remove welding flux immediately.
 - .4 At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- .3 Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize site splicing and assembly and as follows:
 - .1 Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible.
 - .2 Use exposed fasteners of type indicated; or if not indicated, Phillips flat-head countersunk screws or bolts.
 - .3 Locate joints where least conspicuous.

- .4 Disassemble units only as necessary for shipping and handling limitations.
- .5 Use connections that maintain structural value of joined pieces.
- .6 Clearly mark units for reassembly and coordinated installation.
- .4 Anchorage Fabrication: Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support required loads; provide for anchorage of type indicated and suitable for supporting structure, and as follows:
 - .1 Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

3 Execution

3.1 Installation

- .1 Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.
- .2 Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels and as follows:
 - .1 Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
 - .2 Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.

- .3 Site Welding: Perform welding work in accordance with CSA W59; do not weld, cut or abrade surfaces of exterior units that have been hot dip galvanized after fabrication and are for bolted or screwed site connections and as follows:
 - .1 Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - .2 Obtain fusion without undercut or overlap.
 - .3 Remove welding flux immediately.
 - .4 At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

3.2 Closeout activities

- .1 Adjusting:
 - .1 Touch-Up of Shop Applied Primer: Immediately after erection, clean site welds, bolted connections, and abraded areas of shop coatings, and recoat exposed areas using same material as used for shop priming in accordance with SSPC-PA1 for touching up shop coated surfaces; apply by brush or spray to minimum 0.05 mm dry film thickness.
- .2 Cleaning:
 - .1 Galvanized Surfaces: Clean site welds, bolted connections, and abraded areas and repair galvanizing.

3.3 Schedule of components

- .1 The following listing of metal fabrications is provided by Owner for convenience of Contractor. Every attempt has been made to provide complete list of metal fabrications; however, it is not intended to be comprehensive listing, which is Contractor's responsibility; list of metal fabrications includes, but is not limited to, following:
 - .1 Loose Bearing and Levelling Plates: Provide plates for steel items bearing on masonry or concrete construction; drill plates to receive anchor bolts and for grouting; galvanize plates after fabrication.

- .2 Miscellaneous Framing and Supports: Structural steel shapes, plates, and bars of welded construction; galvanize where located in exterior construction; fabricated to sizes, shapes, and profiles necessary to receive adjacent construction retained by framing and supports; cut, drill, and tap units to receive hardware, hangers, and similar items including but not limited to following:
 - .1 Steel framing and supports for countertops
 - .2 Steel framing and supports for mechanical and electrical equipment
 - .3 Steel framing and supports for applications where framing and supports are not specified in other Sections
 - .4 Miscellaneous steel trim

End of section

1 General

1.1 Section includes

- .1 This section includes requirements for supply and installation of dimensional lumber for miscellaneous blocking.

1.2 Related Requirements

- .1 Section 05 50 00 – Metal Fabrications

1.3 Reference standards

- .1 American Wood Protection Association ([AWPA](#)):
 - .1 AWPA Book of Standards, 2023
- .2 Canadian Standards Association ([CSA Group](#)):
 - .1 CSA B111-1974 (R2003), Wire Nails, Spikes and Staples
 - .2 CAN/CSA O121-08(R2013), Douglas Fir Plywood
 - .3 CAN/CSA O141-05 (R2014), Softwood Lumber
 - .4 CAN/CSA O151-09(R2014), Canadian Softwood Plywood
 - .5 CSA O325-07(R2012), Construction Sheathing
 - .6 CSA O437 Series 93 (R2011) OSB and Waferboard
- .3 National Lumber Grading Authority ([NLGA](#)):
 - .1 NLGA Standard Grading Rules for Canadian Lumber, 2022

1.4 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 manufacturer's product data for factory fabricated products indicating component materials and dimensions, and include construction and application specific details where required.

1.5 Delivery, storage and handling

- .1 Delivery and Acceptance Requirements: Protect materials from weather in transit and on the jobsite
- .2 Storage and Handling Requirements: Store materials using pallets or blocking 150 mm minimum from ground covered with protective waterproof sheets allowing for air circulation and ventilation under the covering, and as follows:
 - .1 Protect edges and corners of sheet materials from damage during handling and storage.
 - .2 Do not store seasoned materials under conditions that will cause moisture content to increase.
 - .3 Do not store NAUF products in contact with or in close proximity to other materials that may contain urea-formaldehyde and that have potential to contaminate NAUF products.

2 Products

2.1 Performance requirements

- .1 Lumber Grades: Provide lumber products that are all sides finished (S4S) in nominal dimensions required for the project; grade-marked by accredited agencies of the Canadian Lumber Standards Accreditation Board and conform to Standard Grading Rules published by the National Lumber Grades Authority.
- .2 Panel Grades: Provide panel products that are grade-marked by agencies recognized by CSA O325 and National Institute of Standards and Technology, Voluntary Product Standard PS 2-04 Performance Standard for Wood-Based Structural-Use Panels as modified by other listed CSA panel standards.

2.2 Materials

- .1 Miscellaneous Framing, Blocking and Strapping: Provide materials meeting CAN/CSA O141 and NLGA Rules having maximum moisture content at time of dressing of 19%, consisting of species group D (SPF) Construction Grade or better.

- .2 Plywood:
 - .1 G1S Plywood: Sanded, square edged Douglas Fir (DFP), G1S plywood meeting requirements of CSA O121; Grade A Face and Grade C inner plies and back.
 - .2 Sheathing Grade Plywood : Sheathing Grade square edged Douglas Fir or Canadian Softwood plywood meeting requirements of CSA O121 or CSA O151.

2.3 Accessories

- .1 Nails, Brads and Staples: Steel nails meeting requirements of CSA B111, length to penetrate connecting solid wood materials and as follows:
 - .1 Interior High Humidity Work: Hot dipped galvanized
 - .2 Interior Work: Electroplated zinc plated or cadmium plated
 - .3 Pressure Treated Materials: Stainless steel
- .2 Rough Hardware (Bolts, Nuts and Washers): Provide fasteners of size and type required for installation and as follows:
 - .1 Ground Contact Materials: Stainless steel
 - .2 Interior High Humidity Work: Hot dipped galvanized
 - .3 Interior Work: Electroplated zinc plated or cadmium plated
 - .4 Pressure Treated Materials: Stainless steel
- .3 Wood Screws: Steel screws meeting requirements of ASME B18.6.1 and as follows:
 - .1 Interior Work: Galvanized
- .4 Screws for Fastening to Cold Formed Metal Framing: Steel screws meeting requirements of ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
- .5 General Purpose Adhesives: Gun grade, cartridge loaded adhesives meeting requirements of GS-36 for Commercial Adhesive, South Coast Air Quality Management District Rule 1168 and meeting requirements of CSA O112 having maximum VOC content of 70 g/L

3 Execution

3.1 Installation

- .1 Set miscellaneous rough carpentry to required levels and lines with members plumb, true to line, cut, and fitted; fit miscellaneous rough carpentry to other construction; scribe and cope as needed for accurate fit; locate furring, nailers, blocking, grounds, and similar supports as required attaching to other construction.
- .2 Plywood Backing: Install 19 mm plywood in metal stud assemblies flush with backside of gypsum board for blocking were indicated on Drawings.

End of section

1 General

1.1 Section Includes

- .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

1.2 Related Requirements

- .1 Section 05 50 00 – Metal Fabrication
- .2 Section 06 61 16 – Solid Surfacing Fabrications
- .3 Section 09 91 00 - Painting

1.3 Quality Assurance

- .1 Contractor executing work of this section shall have five (5) years continuous experience in successful manufacture/fabrication and installation of work of type and quality shown and specified. Submit proof of experience upon Owner'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 Submit submittals in accordance with the General Conditions and 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, Owner, 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. Defects shall include but not be limited to, opening of joints, cracking, shrinkage, warpage, delamination of plastic laminate.

2 Products

2.1 Materials

- .1 Panel Materials:
 - .1 Plywood: Douglas Fir veneer core plywood, 19 mm (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/m³ density.
 - .3 Medium density fibreboard (MDF): ANSI A208.2, density minimum 750 kg/m³, moisture resistant; standard of acceptance: Premier Plus MR MDF by Flakeboard.
- .2 Glue: CSA 0112 , Type 1. Water-resistant urea-formaldehyde resin glue.
- .3 Wall Mounted Standards and Brackets:
 - .1 Wall Mounted Standards: 22 mm (7/8") wide x 17.5 mm (11/16") high 12 gauge heavy-duty wall mounted standards with 50 mm (2") slot adjustment, 914 mm (3') long with anachrome finish and capable of supporting 65 lbs./100 sq.ft.. Basis of design: '87 ANO' by Knape & Vogt Canada or approved alternate.
 - .2 Brackets: 305 mm (12") heavy-duty steel brackets with single, moulded nylon cam lock lever and anachrome finish. Basis of design: '187LL ANO' by Knape & Vogt Canada or approved alternate.
 - .3 Shelf Rests: Provide end, centre and front type shelf rests with anachrome finish, complete with rubber cushions as required and for joining 2 shelves on one bracket. Basis of Design: '210 ANO' (end rest), '211 ANO' (centre rest), '212 ANO' (front rest) and '129 RUB' (rubber cushion for rests), all by Knape & Vogt Canada or approved alternate.

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 framework 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 91 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 cut-outs for sinks, fixtures, fittings, inserts, outlet boxes, services, other mechanical and electrical items and appliances. Round corners, and chamfer edges. Where items for cut-outs butt to underside or back of finished surface, finish exposed edge to match face. Where item covers cut-out, 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 Support counters without cabinets below on solid wood framing, and plywood gables.
- .17 Edging Treatment:
 - .1 Provide PVC Self Edge Laminate: HPDL, colour matching cabinet work.
- .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 19 mm (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 2439 mm (8'). Keep joints 610 mm (2') from cutouts and in locations indicated on reviewed shop drawings.
- .6 Locate joints, where required at 2439 mm to 3048 mm (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 6 mm (1/4") blind spline and approved type draw bolts; one draw bolt for widths up to 150 mm (6") at maximum 457 mm (18") centres for widths exceeding 150 mm (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 cut-outs 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 cut-outs to avoid chipping laminate. Where item covers cut-out, 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 15% or less.

2.4 Finishes

- .1 Provide finishes as indicated on drawings and schedules, in accordance with requirements of Section 09 06 00.

3 Execution

3.1 Condition of Surfaces

- .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 the Owner 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 Owner 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.
- .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 the Owner, 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 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 cut-outs so that hardware item completely covers cut-outs.
- .5 Adjust and lubricate cabinet hardware as required for smooth and efficient operation without binding.

3.4 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 the Owner. Hardware shall operate freely. Protect installed hardware from damage and paint spotting.

End of section

1 General

1.1 Summary

- .1 This Section includes requirements for fabrication of, but not limited to, following:
 - .1 Countertops

1.2 Related Requirements

- .1 Section 06 20 00 – Finish Carpentry and Millwork
- .2 Section 09 06 00 – Schedules for Finishes

1.3 Reference Standards

- .1 National Electronic Manufacturers Association (NEMA):
 - .1 ANSI/NEMA LD3-2005, High Pressure Decorative Laminates (HPDL)
- .2 NSF International/American National Standards Institute (ANSI):
 - .1 NSF/ANSI 51-2019, Food Equipment Materials
- .3 Underwriters Laboratories Canada (ULC):
 - .1 CAN/ULC S102-18, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies

1.4 Administrative requirements

- .1 Preinstallation Meetings: Arrange preinstallation meeting 1 week prior to in accordance with Section 01 31 19 – Project Meetings, commencing work with all parties associated with trade as designated in Contract Documents or as requested by Owner. Presided over by Contractor, include Owner who may attend, Subcontractor performing work of this trade, Owner's representative, testing company's representative and consultants of applicable discipline.

- .2 Review Contract Documents for work included under this trade and determine complete understanding of requirements and responsibilities relative to work included, storage and handling of materials, materials to be used, installation of materials, sequence and quality control, Project staffing, restrictions on areas of work and other matters affecting construction, to permit compliance with intent of work of this Section.

1.5 Submittals

- .1 Provide required information in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Action Submittals: Provide following submittals before starting any work of this Section:
 - .1 Product Data: Submit manufacturer's standard product data indicating 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: Submit two (2) representative samples indicate full range of color and pattern variation.

1.6 Project closeout submissions

- .1 Operation and Maintenance Data: Submit copies of manufacturer's written maintenance information for inclusion in operations manual in accordance with Section 01 78 00 – Closeout Submittals; provide specific warning of any maintenance practice or materials that may damage or disfigure finished Work.

1.7 Quality assurance

- .1 Qualifications: Provide proof of qualifications when requested by Owner:
 - .1 Fabricator: Use fabricator having three (3) years experience in fabrication and installation of solid surface materials and have training and certification from manufacturer for work of similar scope and complexity as that required for project.

1.8 Delivery, storage and handling

- .1 Delivery and Acceptance Requirements: Deliver components to project when areas are ready for installation.
- .2 Storage and Handling Requirements: Store components indoors in heated conditions similar to area of installation until ready for installation; handle materials to prevent damage to finished surfaces; provide protective coverings to prevent physical damage or staining following installation until just prior to Substantial Performance for Project.

1.9 Warranty

- .1 Manufacturer Warranty: Provide manufacturer's standard 10 year warranty against defects in materials and workmanship; including material and labour to repair or replace defective materials.

2 Products

2.1 Manufacturers

- .1 Basis-of-Design Products: Products named in this Section were used as basis-of-design for project; manufacturers listed as additional Acceptable Products and that offer similar products may be incorporated into work of this Section provided they meet performance requirements established by named products.
- .2 Additional Acceptable Products Manufacturers: Subject to compliance with performance requirements specified in this Section; as established by Basis-of-Design Products, use any of listed manufacturers' products in accordance with Section 01 61 00 – Common Product Requirements; following manufacturer's do not require submission of request for substitutions provided required shop drawing and product data submissions are submitted before starting any work of this Section:
 - .1 Aristech Surfaces, Avonite
 - .2 DuPont Canada, Corian
 - .3 Lotte, Staron
 - .4 Wilsonart Engineered Surfaces
 - .5 Or approved alternate

- .3 Substitutions: Owner may consider additional manufacturers having similar products to Acceptable Products Manufacturers listed above during construction period, provided they meet performance requirements established by named products and provided they submit requests for substitution in accordance with Section 01 61 00 – Common Product Requirements before starting any work of this Section:
 - .1 Do not use substitute materials to establish Bid Price.
 - .2 Substitutions that appear as part of project without review and acceptance by Owner will be rejected, and replaced with one of specified materials.

2.2 Materials

- .1 Solid Surfacing Sheet: Cast, nonporous, filled polymer, with through body colour meeting requirements of ANSI/NEMA LD3, and having following nominal properties:
 - .1 Thickness: 13 mm or as indicated on Drawings.
 - .2 Surface Burning Characteristics: in accordance with CAN/ULC S102 and as follows:
 - .1 Flame Spread: Maximum 25
 - .2 Smoke Developed: Maximum 25
 - .3 Pattern and Colour: As indicated in Section 09 06 00.

2.3 Accessories

- .1 Joint Adhesive: Manufacturer's recommended adhesive designed to create chemically bonded, inconspicuous, nonporous joints.
- .2 Panel Adhesive: Manufacturer's recommended flexible adhesives, suitable for use with product and application.
- .3 Sealant: Mildew resistant, silicone sealant, as specified in Section 07 92 00.

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 manufacturer's written instructions using fabricator certified by 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 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 manufacture's standard joint adhesive and reinforcing strips.
- .5 Make cut outs with 3 mm radius corners to prevent stress cracking.
- .6 Fabrication assemblies with tolerances as follows:
 - .1 Variation in component size: ± 3 mm.
 - .2 Location of openings: ± 3 mm 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 Installation

- .1 Install components plumb and level, in accordance with shop drawings and manufacturers written installation requirements.
- .2 Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work.

3.2 Closeout activities

- .1 Adjusting:
 - .1 Repair or replace damaged work that cannot be repaired to match installed work at no additional cost to Owner.
- .2 Cleaning:
 - .1 Keep components and hands clean during installation; remove adhesives, sealants and other stains as work progresses; keep components clean until Substantial Performance for Project.

3.3 Protection

- .1 Protect installed products and components from damage during construction.
- .2 Protect surfaces from damage until date of Substantial Performance of the Work.

End of section

1 General

1.1 Summary

- .1 This Section includes requirements for joint sealant products, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer's testing and site experience and includes for the application types and other applications specified by reference to this Section.

1.2 Related requirements

- .1 Other sections of the specification requiring sealants refer to this section; coordinate requirements of referencing sections.

1.3 Reference standards

- .1 American Society for Testing and Materials (ASTM International):
 - .1 ASTM C834-17, Standard Specification for Latex Sealants
 - .2 ASTM C920-14a, Standard Specification for Elastomeric Joint Sealants
 - .3 ASTM C1193-16, Standard Guide for Use of Joint Sealants
 - .4 ASTM C1248-08(2012), Standard Test Method for Staining of Porous Substrate by Joint Sealants
- .2 Canadian General Standards Board (CGSB):
 - .1 CGSB 19-GP-5M, Sealing Compound, Single component, Acrylic Base, Solvent Curing
 - .2 CAN/CGSB 19.17-M90, Single component, Acrylic Emulsion Base Sealing Compound
 - .3 CAN/CGSB 19.13-M87, Sealing Compound, Single component, Elastomeric, Chemical Curing
 - .4 CAN/CGSB 19.24-M90, Multicomponent, Chemical Curing, Sealing Compound

1.4 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 for each joint sealant product indicated.
- .3 Informational Submittals: Provide the following submittals when requested by the Owner:
 - .1 Certificates: Submit product certificates for each type of joint sealant and accessory, signed by product manufacturer certifying that materials used are appropriate for applications that they were used.

1.5 Quality assurance

- .1 Qualifications: Provide proof of qualifications when requested by Owner:
 - .1 Manufacturer: Obtain each type of joint sealant through one source from a single manufacturer.
 - .2 Installer: Employ installers who are experienced with the use and application of materials specified in this Section, having experience with projects of a similar extent and complexity, and that are approved or licensed for installation of elastomeric sealants by manufacturer if required for warranty conditions.

1.6 Project conditions

- .1 Proceed with installation of joint sealants only when the following conditions are met:
 - .1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer.
 - .2 Joint substrates are dry.
 - .3 Joint widths are within tolerances of those permitted by joint sealant manufacturer for applications indicated.

- .4 Substrates are free from contaminants capable of interfering with adhesion.

1.7 Warranty

- .1 Manufacturer's shall provide a warranty stating that they agree to provide joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section for a period of five (5) years from Substantial Performance for the Project.
- .2 It is understood that the specified warranties exclude deterioration or failure of joint sealants arising from the following conditions:
 - .1 Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
 - .2 Disintegration of joint substrates from natural causes exceeding design specifications.
 - .3 Mechanical damage caused by individuals, tools, or other outside agents.
 - .4 Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

2 Products

2.1 Manufacturers

- .1 Acceptable Product Manufacturers: Subject to compliance with requirements specified in this Section; where multiple listings of manufacturers occur, use any of the following listed manufacturers' products:
 - .1 BASF Corporation Construction Systems
 - .2 Chemtron Manufacturing Ltd.
 - .3 C.R. Laurence of Canada
 - .4 Dow Corning Canada Inc.
 - .5 GE, Momenive Performance Materials Inc.
 - .6 Pecora Corporation
 - .7 Sika Chemical of Canada Ltd.

- .8 Tremco Ltd.
- .9 Or approved alternate.
- .2 Substitutions: Owner may consider additional manufacturers having similar products to Acceptable Products Manufacturers listed above during the construction period, provided they meet the performance requirements established by the named products:
 - .1 Do not use substitute materials to establish Bid Price.
 - .2 Substitutions that appear as a part of the project without review and acceptance by the Owner will be rejected, and replaced with one of the specified materials.

2.2 Performance requirements

- .1 Interior Building Envelope Sealants: Provide joint sealant products for interior applications that establish and maintain airtight and water resistant continuous joint seals without staining or deteriorating joint substrates or adjacent materials.
- .2 Elastomeric Joint Sealants: Provide sealant products in accordance with ASTM C920 classifications for type, grade, class, and uses related to exposure and joint substrates and as follows:
 - .1 Provide products that have been tested in accordance with ASTM C1248 where elastomeric sealants are required for non-staining to porous substrate applications.
- .3 Latex Joint Sealants: Provide sealant products in accordance with ASTM C834, temperature Grade to suit related exposure and joint substrates, paintable, non-sag and non-staining for general application.

2.3 Liquid sealants

- .1 Type S-2 Silicone Sealant, Mould and Mildew Resistant: Silicone based, single component, 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 NS, Class 25, use NT:
 - .1 Acceptable Products:
 - .1 BASF OmniPlus
 - .2 CRL 33S

- .3 Dowsil 786
 - .4 Momentive GE SCS 1700 Sanitary
 - .5 Pecora 898NST
 - .6 Tremco Tremsil 200
 - .7 Or approved alternate
- .2 Type S-10, Polyurethane Sealant: Single component, non-sag, for general construction, Shore A Hardness 15+, conforming to CAN/CGSB 19.13-M, Type 2, Classification MCG-2-25-A-N and ASTM C920, Type S, Grade NS, Class 25, Use NT, M, and A:
 - .1 Acceptable Products:
 - .1 BASF MasterSeal NP 1
 - .2 Chemtron Multiflex
 - .3 Sikaflex 1a
 - .4 Tremco Dymonic
 - .5 Tremco Vulkem 116
 - .6 Or approved alternate

2.4 Preformed sealants

- .1 Preformed Silicone Sealant System: Manufacturer's standard system consisting of pre-cured low modulus silicone extrusion, in sizes to fit joint widths indicated, combined with a neutral curing silicone sealant for bonding extrusions to substrates:
 - .1 Acceptable Products:
 - .1 Dow Corning Corporation; Dowsil 123 Silicone Seal
 - .2 Momentive GE US1100 UltraSpan
 - .3 Tremco; Spectrem Ez Seal
 - .4 Or approved alternate

2.5 Sealant backing

- .1 Provide sealant backings of material and type that are non-staining, compatible with joint substrates, sealants, primers, and other joint fillers, and are approved for applications indicated by sealant manufacturer based on site experience and laboratory testing.

- .2 Backing Rods: Meeting requirements of ASTM C1330, Type C (closed cell material with a surface skin); Type O (open cell material); or Type B (bi-cellular material with a surface skin) and as follows:
 - .1 Use backing rod materials specifically recommended by joint sealer manufacturer for type of installation and materials being used.
 - .2 Use any of the preceding types, as approved in writing by joint sealant manufacturer for joint application indicated.
 - .3 Size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
 - .4 Non-adhering to sealant, to maintain two sided adhesion across joint.
- .3 Bond Breaker Tape: Self adhesive polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where three-sided adhesion will result in sealant failure.

2.6 Accessories

- .1 Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from pre-construction joint sealant substrate tests and site tests.
- .2 Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- .3 Masking Tape: Non-staining, non-absorbent material compatible with joint sealants and surfaces adjacent to joints.

3 Execution

3.1 Examination

- .1 Examine joints indicated to receive joint sealants for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance.
- .2 Proceed with installation after unsatisfactory conditions have been corrected.
- .3 Pre-Construction Site Adhesion Testing: Site test adhesive adhesion to joint substrates before installing sealants as follows:
 - .1 Locate test joints where indicated on Drawings or, if not indicated, as directed by Owner.
 - .2 Conduct site tests for each application indicated below:
 - .1 Each type of elastomeric sealant and joint substrate indicated.
 - .2 Each type of non-elastomeric sealant and joint substrate indicated.
 - .3 Notify Owner seven (7) days in advance of dates and times when test joints will be installed.
 - .4 Arrange for tests to take place with joint sealant manufacturer's technical representative present in accordance with ASTM C1193, and as follows:
 - .1 Test Method: X1.1 Method A, Site Applied Sealant Joint Hand Pull Tab
 - .5 Verify adhesion to each substrate separately for joints with dissimilar substrates; extend cut along one side, verifying adhesion to opposite side; repeat procedure for opposite side.
 - .6 Report whether sealant in joint connected to pulled out portion failed to adhere to joint substrates or tore cohesively:
 - .1 Include data on pull distance used to test each type of product and joint substrate.
 - .2 Retest until satisfactory adhesion is obtained for sealants that fail adhesively.
 - .7 Evaluation of Pre-construction Site Adhesion Test Results:

- .1 Sealants not evidencing adhesive failure from testing, in absence of other indications of non-compliance with requirements, will be considered satisfactory.
- .2 Do not use sealants that fail to adhere to joint substrates during testing.

3.2 Preparation

- .1 Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions and the following requirements:
 - .1 Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - .2 Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants.
 - .3 Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil free compressed air.
 - .4 Remove laitance and form release agents from concrete.
 - .5 Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
 - .6 Porous joint substrates include the following:
 - .1 Concrete.
 - .2 Masonry.
 - .3 Unglazed surfaces of ceramic tile.
 - .7 Nonporous joint substrates include the following:
 - .1 Metal.
 - .2 Glass.
 - .3 Porcelain enamel.

- .2 Prime joint substrates as recommended in writing by joint sealant manufacturer, based on pre-construction joint sealant substrate tests or prior experience:
 - .1 Apply primer to comply with joint sealant manufacturer's written instructions.
 - .2 Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.
- .3 Install bond breaker tapes in joints that are too shallow to allow for installation of backing rods.
- .4 Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears; remove tape immediately after tooling without disturbing joint seal.

3.3 Installation of joint sealants

- .1 Comply with joint sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- .2 Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- .3 Install sealant backings of type indicated to support sealants during application and at position required to produce cross sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - .1 Do not leave gaps between ends of sealant backings.
 - .2 Do not stretch, twist, puncture, or tear sealant backings.
 - .3 Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- .4 Install bond breaker tape behind sealants where sealant backings are not used between sealants and backs of moving joints.
- .5 Install sealants at the same time backings are installed, and as follows:

- .1 Place sealants so they directly contact and fully wet joint substrates.
 - .2 Completely fill recesses in each joint configuration.
 - .3 Produce uniform, cross sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- .6 Sealants: Immediately after sealant application and before skinning or curing begins, tool non-sag sealants to form smooth, uniform beads, to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint, and as follows:
- .1 Remove excess sealant from surfaces adjacent to joints.
 - .2 Use tooling agents and profiles that are approved in writing by sealant manufacturer and that do not discolour sealants or adjacent surfaces in accordance with the figures listed in ASTM C1193 as follows:
 - .1 Provide concave joints in accordance with Figure 8A.
 - .2 Provide flush joint in accordance with Figure 8B.
 - .3 Provide recessed joint configuration in accordance with Figure 8C.
 - .4 Use masking tape to protect surfaces adjacent to recessed tooled joints.
- .7 Install preformed silicone sealant system as follows:
- .1 Apply masking tape to each side of joint, outside of area covered by sealant system.
 - .2 Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone sealant system manufacturer's written instructions and covering a bonding area of not less than 10 mm.
 - .3 Hold edge of sealant bead 6 mm inside masking tape.
 - .4 Press silicone extrusion into sealant to wet extrusion and substrate within 10 minutes of sealant application.
 - .5 Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.

- .6 Complete installation of sealant system in horizontal joints before installing in vertical joints.
- .7 Lap vertical joints over horizontal joints.
- .8 Cut silicone extrusion with a razor knife at ends of joints.

3.4 Site quality control

- .1 Site test joint sealant adhesion to joint substrates as a part of the Contract and as follows:
 - .1 Extent of Testing: Test completed elastomeric sealant joints as follows:
 - .1 Perform one (1) test for each 100 metres of joint length joint length for each type of elastomeric sealant and joint substrate.
 - .2 Test Method: Test joint sealants according to Method A, Site Applied Sealant Joint Hand Pull Tab in Appendix X1 in ASTM C 1193.
 - .3 Verify adhesion to each substrate separately for joints having dissimilar substrates; do this by extending cut along one side, verifying adhesion to opposite side, repeat procedure for opposite side.
 - .4 Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements.
 - .5 Record results in a site adhesion test log, and submit to Owner as a part of Record Document submissions listed in Section 01 78 00 – Closeout Submittals.
 - .6 Inspect tested joints and report on the following:
 - .1 Whether sealants in joints connected to pulled out portion failed to adhere to joint substrates or tore cohesively:
 - .1 Include data on pull distance used to test each type of product and joint substrate.
 - .2 Compare these results to determine if adhesion passes sealant manufacturer's site adhesion hand pull test criteria.
 - .2 Whether sealants filled joint cavities and are free of voids.

- .3 Whether sealant dimensions and configurations comply with specified requirements.
- .4 Record test results in a site adhesion test log:
 - .1 Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
 - .2 Report any failed tests to the Contractor and the Owner, and indicate repair procedure undertaken to correct failed sealant.
- .7 Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints, ensuring that original sealant surfaces are clean and that new sealant contacts original sealant.
- .2 Sealants not evidencing adhesive failure from testing or non-compliance with other indicated requirements will be considered satisfactory:
 - .1 Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements.
 - .2 Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 Cleaning

- .1 Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 Protection

- .1 Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Performance.
- .2 Cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work if, despite protection measures, damage or deterioration occurs.

3.7 Joint sealant schedule

- .1 Where no specified type of sealant is shown or specified choose one of the sealants specified in this Section applicable to that intended application, and consistent with manufacturer's recommendations.
- .2 Use silicone general construction polyurethane sealant S-10 for all joints where no other specific sealant type specified; do not use on horizontal traffic joints or where immersed in water.
- .3 Use mould and mildew resistant silicone sealant Type S-2 for non-moving joints in washrooms and kitchens; do not use on floors.
- .4 In addition, seal the following joints:
 - .1 Interior joints in the following vertical surfaces and horizontal non-traffic surfaces:
 - .1 Control and expansion joints on exposed interior surfaces of exterior walls.
 - .2 Perimeter joints of exterior openings where indicated.
 - .3 Tile control and expansion joints.
 - .4 Vertical joints on exposed surfaces of interior unit concrete walls.
 - .5 Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - .6 Seal joints in floor and wall penetrations around service and fixture penetrations.
 - .7 Seal joints at heads of non-load-bearing block walls on both sides, as indicated on drawings.
 - .8 Other joints as indicated.
 - .2 Interior joints in the following horizontal traffic surfaces:
 - .1 Isolation joints in cast-in-place concrete slabs.
 - .2 Other joints as indicated.

End of section

1 General

1.1 Summary

- .1 This Section includes requirements for supply and installation of the following:
 - .1 Steel doors
 - .2 Steel door frames

1.2 Related requirements

- .1 Section 07 92 00 – Joint Sealants: Caulking joints between frames and other building components.
- .2 Section 08 71 00 – Door Hardware: Door hardware and Door Hardware Schedule
- .3 Section 09 06 00 – Schedules for Finishes: Colours of prefinished doors and frames.
- .4 Section 09 91 00 – Painting: Site painting hollow metal primed doors and frames.

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: Standard metric door sizes indicated in 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 Reference standards

- .1 Steel Door Institute (SDI):
 - .1 ANSI/SDI A250.7-1997 (R2002), Nomenclature for Standard Steel Doors and Steel Frames
 - .2 ANSI/SDI A250.11-2012, Recommended Erection Instructions for Steel Frames.

- .2 American Society for Testing and Materials (ASTM):
 - .1 ASTM A653/A653M-20, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .2 ASTM A879/A879M-12(2017), 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-20, Standard Specification for General Requirements for Sheet Steel, Metallic Coated by the Hot Dip Process
 - .4 ASTM E90-09(2016), Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
 - .5 ASTM E413-16, Classification for Rating Sound Insulation
 - .6 ASTM E1425-14, Standard Practice for Determining the Acoustical Performance of Windows, Doors, Skylight, and Glazed Wall Systems
- .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 W59-18, Welded Steel Construction
- .5 Canadian Steel Door Manufacturers Association (CSDMA):
 - .1 Recommended Dimensional Standards for Commercial Steel Doors and Frames, 2009
 - .2 Fire Labelling Guide, 2009
- .6 International Organization for Standardization (ISO)
 - .1 CSA/ISO 14021:20 – Environmental Labels and Declarations, Self Declared Environmental Claims (Type II Environmental Labelling)

- .7 National Fire Protection Association (NFPA):
 - .1 NFPA 80-2019, Standard for Fire Doors and Other Opening Protectives
 - .2 NFPA 252-2017, Standard Methods of Fire Tests of Door Assemblies
- .8 National Council on Radiation Protection and Measurement (NCRP):
 - .1 Report No. 049 Structural Shielding Design and Evaluation for Medical Use of X-Rays and Gamma Rays of Energies up to 10 MeV
- .9 Underwriters Laboratories Canada (ULC):
 - .1 CAN/ULC-S104-15, Standard Method for Fire Tests of Door Assemblies
 - .2 CAN/ULC-S105-16, Standard Specification for Fire Door Frames Meeting the Performance Required by CAN/ULC-S104
 - .3 CAN/ULC-S701.1(2017), Standard for Thermal Insulation, Polystyrene Boards
 - .4 CAN/ULC-S702.1(2014)-AMD1, Standard for Mineral Fibre Thermal Insulation for Buildings
 - .5 CAN/ULC-S705.1-15, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Material Specification
 - .6 CAN/ULC-S705.2-05, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Installer's Responsibilities - Specification
- .10 Intertek Testing Services/Warnock Hersey (WH):
 - .1 Fire Rating Services, Building Materials and Equipment, Listings.

1.5 Administration requirements

- .1 Coordination: Coordinate throat dimensions based on actual material used for wall construction assemblies; modifications arising from substitute materials may affect throat clearance required for actual construction.

1.6 Submittals

- .1 Provide requested 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 for each type of door and frame indicated, include door designation, type, level and model, material description, core description, construction details, label compliance, sound ratings, fire resistance ratings, and finishes.
 - .2 Shop Drawings: Submit Shop Drawings indicating the following:
 - .1 Frame details for each frame type including dimensioned profiles
 - .2 Details and locations of reinforcement and preparations for hardware
 - .3 Details of each different wall opening condition
 - .4 Details of anchorages, accessories, joints, and connections
 - .5 Reference door types to door schedule; indicate door numbers related to Drawings and Door Schedule
- .3 Informational Submittals: Provide the following submittals when requested by the Owner:
 - .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.

1.7 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.
- .4 Testing Agencies: Provide doors produced under label service program of a testing agency acceptable to Authorities Having Jurisdiction, and as follows:
 - .1 Affix appropriate label to each opening requiring indicating a labelling requirement listed in Section 08 71 00 as follows:
 - .1 At standard size openings: fire endurance rating.
 - .2 At oversized openings: unclassified as to fire rating.

1.8 Delivery, storage, and handling

- .1 Delivery and Acceptance Requirements: Deliver doors and frames to project site; provide protection during transit and site storage to prevent distortion or indentation, and any additional protection required to prevent damage to finish of doors and frames and as follows:
 - .1 Inspect doors and frames on delivery for damage, and notify shipper and supplier if damage is found.
 - .2 Minor damages may be repaired provided refinished items match new work and are acceptable to the Owner.
 - .3 Remove and replace damaged items that cannot be repaired as directed by the Owner, at no additional cost to the Owner.
- .2 Storage and Handling Requirements: Store doors and frames at building site under cover and protected from moisture, blocked off the ground and in a manner to prevent sagging, bowing or twisting using wood blocking and as follows:
 - .1 Remove wet wrapping materials immediately upon delivery.
 - .2 Provide vented shelters to prevent humidity conditions that could damage door and frame finish.

- .3 Provide space between stacked doors to permit air circulation.

1.9 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 Steel Sheet:
 - .1 Metallic coated steel sheets in accordance with ASTM A924/A924M; coated to meet requirements of ASTM A653/A653M, Commercial Steel (CS), Type B, ZF75 galvanized; suitable for unexposed applications; stretcher levelled standard of flatness.
- .2 Door Cores:
 - .1 Honeycomb: Structural small cell; 25 mm maximum, kraft paper honeycomb; minimum weight 36 kg/ream; minimum density 16.5 kg/m³; sanded to required thickness.
 - .2 Polystyrene: Rigid extruded, closed cell insulation, fire retardant treated meeting the requirements of CAN/ULC-S701.1, Type 4, minimum thermal resistance RSI 0.8/25 mm thickness.
- .3 Adhesives:
 - .1 Core Adhesive: Heat resistant, single component, polyurethane reactive (water) hot melt, thermoset adhesive.

- .2 Interlocking Edge Seam Adhesive: Resin reinforced polychloroprene (RRPC), fire resistant, high viscosity sealant/adhesive.
- .4 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.
- .5 Accessories:
 - .1 Floor anchors, channel spreaders, nominal 1.60 mm tee anchors, 1.19 mm wall stud anchors, and as follows:
 - .1 Hot dipped zinc coated for exterior locations.
 - .2 Wipe coat galvanized for interior locations.
 - .3 Corrugated, galvanized tee anchors or heavy gauge galvanized wire ties for masonry bond.
 - .4 Drill stud anchors for wire tie to studs.
 - .5 Lag bolts, shields and bushing for existing or concrete openings.
 - .6 Provide anchors appropriate to installation conditions.
 - .2 Sealant: As specified in Section 07 92 00.
 - .3 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 Door fabrication

- .1 Fabricate steel doors rigid, neat in appearance, and free from defects including warp and buckle; 45 mm thickness of types and sizes indicated in Section 08 71 00 and Door, Frame and Hardware Schedule on Drawings, and as follows:
 - .1 Door faces of all steel doors shall be fabricated without visible seams, free of scale, pitting, coil brakes, buckles and waves.
 - .2 Form edges true and straight with minimum radius suitable for thickness of steel used.

- .3 Bevel lock and hinge edges 3 mm in 50 mm; confirm requirement with builder's hardware or door swing that could dictate a different bevel.
- .4 Provide fire labelled doors for those openings requiring fire protection ratings, as indicated in Section 08 71 00 and Door, Frame and Hardware Schedule on Drawings.
- .5 Fabricate doors with the following clearances:
 - .1 Clearance between door and frame and between meeting edges of doors swinging in pairs shall not exceed 3 mm
 - .2 Clearance between the bottom of door and floor shall not exceed 19 mm or as required to accommodate specified hardware
 - .3 Clearance between bottom of door and a raised non-combustible sill in accordance with NFPA 80
 - .4 Clearance between bottom of door and nominal surface of combustible floor coverings in accordance with NFPA 80
- .2 Interior Doors: Flush, lock seam construction, hollow steel doors fabricated in accordance with CSDMA Manufacturing Specifications for Doors and Frames, and as follows:
 - .1 Face sheets: Minimum 1.60 mm base steel sheet thickness.
 - .2 Stiffened and sound deadened with honeycomb core laminated under pressure to each face sheet.
 - .3 Longitudinal edges continuously wire welded and smoothed.

2.3 Panel fabrication

- .1 Fabricate panels from the same materials, construction and finished in the same manner as doors as specified in Article 2.2 above.

2.4 Frame fabrication

- .1 Fabricate door frames with mitred corners of frames and weld continuously along inside of frame profile, or lap and weld concealed corner plates, making exposed faces flush, mitres tight, filled, and finished smooth, and as follows:
 - .1 Knockdown (KD) frames are not acceptable and will be rejected.

- .2 Jambs, heads, mullions, sills and centre rails shall be straight and uniform throughout their lengths.
 - .3 Factory assembled frame product shall be square, free of defects, warps or buckles.
 - .4 Accurately cope joints at mullions, transom bars, sills or centre rails, butted and tightly fitted, with faces securely welded, matching corner joint faces.
 - .5 Fabricate frames in sections for site splicing where required due to site access, or when shipping limitations dictate smaller assemblies, and as follows:
 - .1 Provide 2.74 mm splice plates for site spliced jambs, heads and sills, securely welded into one section, extending 50 mm minimum each side of splice joint.
 - .2 Provide 2.74 mm splice plates for site splices at closed sections (mullions or centre rails) securely welded to the abutting member; extend 100 mm minimum into closed sections when assembled.
 - .3 Site splice joints shall be welded, filled and ground to present a smooth uniform surface after assembly is complete.
 - .6 Provide two (2) temporary steel jamb spreaders welded to the base of the jambs or mullions to maintain proper alignment during shipping and handling; remove spreaders before anchoring frame to floor.
 - .7 Prepare door opening for single stud door silencers, three (3) for single door openings, and two (2) for double door openings, shipped installed; coordinate with painter for removal and reinstallation after finish painting.
- .2 Frames:
- .1 Interior Frames: 1.60 mm minimum for single doors; 1.98 mm for frames with opening width in excess of 1220 mm, with 50 mm standard face frame profile.

2.5 Hardware preparation

- .1 Prepare doors in coordination with hardware schedule in Section 08 71 00 and templates provided by the hardware supplier, and as follows:
 - .1 Fully Templated Mortised Hardware: Factory blank, reinforce, drill and tap doors.
 - .2 Non-Fully Templated Mortised Hardware: Factory blank and reinforce only.
 - .3 Surface Mounted Hardware: Factory reinforce only.
 - .4 Templated Holes 13 mm and Larger: Factory prepared, except mounting and through bolt holes shall be site prepared at the time of application.
 - .5 Templated Holes Less Than 13 mm Ø: Factory prepared only when required for the function of the device (for knobs, levers, cylinders, thumb or turn pieces) or when holes overlap function holes.
 - .6 Site drill and tap for surface mounted hardware or mortised hardware that is not fully templated at the time of hardware application.
- .2 Hardware Reinforcement for Doors and Frames: Carbon steel, welded in place, prime painted, to the following minimum nominal thicknesses:

Hardware Reinforcement	Door (mm)	Frame (mm)
Mortise Hinge:	4.20	4.20
Flush or Surface Bolt Front:	3.51	3.51
Surface or Concealed Closer:	3.51	3.51
Hold Open Arm:	3.51	3.51
Electronic Hardware Reinforcements:	1.98	1.98
Pull Plates and Bars:	1.30	1.30
Door Surface Hardware Reinforcements:	1.98	1.98
Frame surface hardware reinforcements:	2.74	2.74

Hardware Reinforcement	Door (mm)	Frame (mm)
Notes: Provide additional 4.20 mm x 32 mm x 225 mm long reinforcement spanning between hinge plate and face of door or frame, at top hinge location. Provide guard boxes to protect mortised cut-outs from spray applied insulation, fully sealed.		

- .3 Electronic Door Hardware Preparation:
 - .1 Provide templated, electrical passageways, hardware enclosures and junction boxes in accordance with manufacturer's standard requirements, and as required to maintain ULC Fire Labelling requirements; inter-connected with CSA approved conduit, passageways and connectors:
 - .1 Coordinate requirements of door and frame supply for provision of shallow junction boxes supplied and installed by Division 26.
 - .2 Confirm security requirements before manufacturing hollow metal doors and frames.

2.6 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/SDI 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 2 mm out of plumb measured on face of frame, maximum twist corner to corner of 3 mm; 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 1200 mm and wider in accordance with CSDMA Installation Guide; do not use temporary metal spreaders for bracing of frames.

- .4 Place frames before construction of enclosing walls and ceilings, except for frames located in existing walls or partitions, allowing for deflection of adjacent construction to ensure that structural loads are not transmitted to frames, and as follows:
 - .1 Check and correct opening width and height, squareness, alignment, twist and plumb as frames are installed in accordance with CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames.
 - .2 Metal Stud Partitions: Provide a minimum of three wall anchors per jamb for frames up to 2150 mm high and 1 additional anchor for each 600 mm over 2150 mm high; install adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb; attach wall anchors to studs with screws.
 - .3 Remove wooden braces after frames are securely fastened or attached to adjacent construction.
- .5 Install glazing materials and studded door silencers.
- .6 Do not site weld unless approved by Owner in writing for the specific screen.
- .7 For frames over 1220 mm in width, provide vertical support at the centre of head.
- .8 Coordinate grouting of all frames solid to adjacent construction.
- .9 Install fire rated frames in accordance with NFPA 80.
- .3 Frame Tolerances: Install frames to tolerances listed in CSDMA Installation Guide, and as follows:
 - .1 Squareness: Maximum 1.6 mm measured across opening between hinge jam and strike jamb.
 - .2 Plumbness: Maximum 1.6 mm measured from bottom of frame to head level.
 - .3 Alignment: Maximum 1.6 mm measured offset between face of hinge jamb and strike jamb relative to wall construction.
 - .4 Twist: Maximum 1.6 mm 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.
- .5 Install fire rated doors within clearances specified in NFPA 80.

3.3 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.
- .2 Keep steel surfaces free of grout, tar or other bonding materials or sealers; clean grout or other bonding material from surfaces immediately following installation.

End of section

1 General

1.1 Summary

- .1 This Section includes requirements for supply and installation of commercial door hardware for the following:
 - .1 Swinging doors
 - .2 Electrified door hardware
- .2 Coordinating, purchasing, delivering, and scheduling of items specified in this Section is the responsibility of this Section, except for final replacement cores and keys that will be installed by the Owner.

1.2 Related requirements

- .1 Section 07 92 00 – Joint Sealants
- .2 Section 08 11 13 – Steel Doors and Frames

1.3 Definition

- .1 Listed: As defined in NFPA Official Definitions:
 - .1 Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

1.4 Reference standards

- .1 American National Standards Institute (ANSI)/Builders Hardware Manufacturers Association (BHMA):
 - .1 ANSI/ICC A117.1-2017, Standard for Accessible and Usable Buildings and Facilities
 - .2 ANSI/BHMA A156 Standards Set:
 - .1 ANSI/BHMA A156.10-2017, Power Operated Pedestrian Doors

- .2 ANSI/BHMA A156.18-2016, Materials and Finishes
- .3 ANSI/BHMA A156.19-2013, Power Assist and Low Energy Power Operated Doors
- .2 Builders Hardware Manufacturers Association (BHMA):
 - .1 Directory of Certified Products
- .3 Door and Hardware Institute (DHI):
 - .1 Sequence and Format for the Hardware Schedule
 - .2 ANSI/DHI A115.IG-1994, Installation Guide for Doors and Hardware

1.5 Administrative requirements

- .1 Coordination: Obtain and distribute templates for doors, frames, and other work specified to be factory prepared for installing door hardware and coordinate with shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware in accordance with indicated requirements, and as follows:
 - .1 Coordinate with Division 26 for type of wire required for electronic hardware, schedule for installation, and connection to electronic hardware.
 - .2 Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices, access control system, security system and building control system.
- .2 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 and as follows:
 - .1 Coordinate with electrical contractor to provide 120 volt, 60 cycle, single phase 15 Amp service depending on quantity of operators and as follows:
 - .1 Coordinate with electrical contractor for provision of service to each operator from junction box for multiple operators.

- .2 Coordinate with electrical contractor shall provide electrical conduit and wiring from specified controls to operators as outlined on manufacturer's drawings.

1.6 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 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 the following:
 - .1 Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer installed and site installed wiring, and as follows:
 - .1 System schematic
 - .2 Point-to-point wiring diagram
 - .3 Riser diagram
 - .4 Elevation of each door
 - .2 Detail interface between electrified door hardware and fire alarm, access control, security and building control system.
 - .3 Theory of operation for electrified hardware groups.
 - .4 Prepare drawings specifically for the project and submit in hard copy and CAD format:
 - .1 Photocopied drawings and hand reproduced drawings are not acceptable
 - .2 Submit separate elevations and interconnect drawings for each different electrified hardware group

- .3 Samples: Submit samples for exposed door hardware of each type indicated below, in specified finish, full size; tagged with full description for coordination with the door hardware schedule; before submission of final door hardware schedule:
 - .1 Hinges
 - .2 Pivots
 - .3 Locks and latches
 - .4 Bolts
 - .5 Exit devices
 - .6 Cylinders and keys
 - .7 Operating trim
 - .8 Closers
 - .9 Stops and holders
 - .10 Protective trim
 - .11 Door gasketing
 - .12 Thresholds
 - .13 Miscellaneous items
 - .14 Samples will be returned for use on the project.
- .4 Hardware Schedule: Submit door hardware schedule prepared by or under the supervision of qualified Architectural Hardware Consultant (AHC), detailing fabrication and assembly of door hardware, and as follows:
 - .1 Coordinate with Door Hardware Schedule on Drawings for size and thickness of doors, fire rating, and comments relating to door function.
 - .2 Comply with the Door and Hardware Institutes recommended scheduling sequence and vertical format for hardware schedules.
 - .3 Organize door hardware sets in same order listed in Door Hardware Schedule; include the following information:
 - .1 Type, style, function, size, label, hand, and finish of each door hardware item
 - .2 Manufacturer of each item

- .3 Fastenings and other pertinent information
 - .4 Location of each door hardware set, cross-referenced to drawings, both on floor plans, and door and frame schedule
 - .5 Explanation of abbreviations, symbols, and codes contained in schedule
 - .6 Mounting locations for door hardware
 - .7 Door and frame sizes and materials
 - .8 Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.
- .5 Keying Schedule: Submit keying schedule prepared by or under the supervision of qualified Architectural Hardware Consultant (AHC), detailing Owner's final keying instructions for locks, including schematic keying diagram and index each key set to unique door designations.
- .3 Informational Submittals: Provide the following submittals when requested by the Consultant:
- .1 Certificates: Submit product certificates signed by manufacturer of door hardware certifying that products submitted comply with requirements for labelled fire doors, for types and sizes of doors used for the Project, obtain engineered decision from authorities having jurisdiction for non-complying fire rated doors.
 - .2 Source Quality Control Submittals: Submit proof of participation in DHI Continuing Education Program, and apply AHC stamp to completed door hardware schedule.

1.7 Project closeout submissions

- .1 Operation and Maintenance Data: Submit copies of manufacturer's written maintenance information for inclusion in the operations manual in accordance with Section 01 78 00 – Closeout Submittals; provide specific warning of any maintenance practice or materials that may damage or disfigure the finished Work.

- .2 Spare Parts, Tools and Software: Submit unique parts, tools and software for maintaining hardware system in accordance with Section 01 78 00 – Closeout Submittals.

1.8 Quality assurance

- .1 Regulatory Requirements:
 - .1 Building Code Compliance: Conform to ULC and Building Code requirements, as applicable to hardware, for labelled or rated doors and frames, and for exiting, operation and function.
 - .2 Manufacturing Compliance: Use only products listed in the BHMA Directory of Certified Products for hardware of this Project.
- .2 Qualifications: Provide proof of qualifications when requested by Consultant:
 - .1 Supplier: Use a door hardware supplier having warehousing facilities in Project's vicinity and employing at least one permanent staff member who is a fully certified and licensed Architectural Hardware Consultant (AHC), participating in the DHI Continuing Education Program, who will be responsible for the preparation of the door hardware schedule submittal, and as follows:
 - .1 Door hardware supplier shall be available during the course of the Work to consult with Contractor, Consultant, and Owner about door hardware and keying.
 - .2 Door hardware supplier shall have completed projects with electrified door hardware similar in material, design, and extent to that indicated for this Project, and who has the capability of preparing data for electrified door hardware, including shop drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
 - .2 Installer: Installer shall have completed door hardware similar in material, design, and extent to that indicated with a record of successful in-service performance for the last five (5) years.

1.9 Delivery, storage, and handling

- .1 Delivery and Acceptance Requirements: Deliver hardware items in original factory containers, clearly labelling contents and scheduled use for this project and as follows:
 - .1 Inventory door hardware on receipt and provide secure lock up for door hardware delivered to Project site.
 - .2 Store hardware in a clean, well illuminated (500 lux minimum) securely locked storage room accessible only to authorized personnel.
- .2 Storage and Handling Requirements: Store hardware items on shelves; not on floors, separated and packaged as a group for each individual door with the door number, and list of items for that door on each package related to the door hardware schedule, and include basic installation instructions with each item or package and as follows:
 - .1 Maintain an itemized inventory list of each item, updated on a daily basis, to show items in storage and items installed.

1.10 Warranty

- .1 Provide written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
- .2 Failures include the following:
 - .1 Structural failures including excessive deflection, cracking, or breakage
 - .2 Faulty operation of operators and door hardware
 - .3 Deterioration of metals, metal finishes, and other materials beyond normal weathering
 - .4 Other failures not resulting from normal usage

- .3 Warranty Period: From date of Substantial Performance, and as follows:

Hardware Type	Warranty Term
Locks, latches and cylinders	5 year
Closers	10 years
Hinges	Lifetime
Miscellaneous	1 year
Electrical Hardware	5 years

2 Products

2.1 Scheduled door hardware

- .1 Coordinate the work of trades, including glass and glazing, and electrical requirements covered in manufacturer's details and appropriate sections of the specifications.

2.2 Manufacturers

- .1 Substitutions: Consultant may consider additional manufacturers having similar products to Acceptable Products Manufacturers listed above during the construction period, provided they meet the performance requirements established by the named products:
- .1 Do not use substitute materials to establish Bid Price.
 - .2 Substitutions that appear as a part of the project without review and acceptance by the Consultant will be rejected and replaced with one of the specified materials.

2.3 Performance requirements

- .1 Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated, and generally comply with the following provisions:
- .1 Accessibility requirements in accordance with ANSI 117.1
 - .2 Handles, Pulls, Latches, Locks, and other Operating Devices:
Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist
 - .3 Door Closers: Maximum opening force requirements as follows:

- .1 Interior Hinged Doors: Nominal 20 N applied perpendicular to door
- .4 Thresholds: Maximum 13 mm high; bevel raised thresholds with a slope of maximum 1:2.
- .5 Latches, Locks, and Exit Devices: Nominal 65 N to release the latch, and shall not require the use of a key, tool, or special knowledge for operation.
- .6 Delayed Egress Locks: Lock releases within 15 seconds after applying a force nominal 90 N.
- .7 Door Closers: Nominal 130 N to set door in motion and nominal 65 N to open door to minimum required width.

2.4 Materials

- .1 General:
 - .1 Install hardware to comply with applicable fire and building codes and requirements of local authorities having jurisdiction over doors and hardware.
 - .2 Template hardware applied to metal doors and frames.
 - .3 Supply hardware complete with all necessary screws, bolts and other fastening of suitable size and type to anchor the hardware in position neatly and properly in accordance with the best practices and to the Consultant's approval.
- .2 Thresholds:
 - .1 Provide and install thresholds exactly as specified in required widths and lengths to suit door openings.
 - .2 Cut ends of thresholds to follow exactly with door frame profile.
 - .3 Supply thresholds and installed complete with lead shields and stainless steel screws.
- .3 Product selection:
 - .1 Butt Hinge: CB179, 114 x 102 x NRP, satin Stainless Steel.
 - .1 Stanley;
 - .2 Ives;
 - .3 McKinney;

- .4 Or approved alternate.
- .2 Door pull: 167F, satin stainless steel.
 - .1 Gallery;
 - .2 CBH;
 - .3 Rockwood;
 - .4 Or approved alternate.
- .3 Push plate: GSH 80A – 150x915 (rounded corners), satin stainless steel
 - .1 HES;
 - .2 Global Industries;
 - .3 Rockwood;
 - .4 Or approved alternate.
- .4 Floor stop: GSH 209, satin chrome
 - .1 Gallery;
 - .2 CBH;
 - .3 Rockwood;
 - .4 Or approved alternate.
- .5 Kick Plate: GSH 80 203x927, satin stainless steel
 - .1 Gallery;
 - .2 CBH;
 - .3 Rockwood;
 - .4 Or approved alternate.

3 Execution

3.1 Examination

- .1 Examine doors and frames, with installer present, for compliance with requirements for installation tolerances, labelled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- .2 Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

- .3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Installation

- .1 Preparation: Prepare doors and frames as follows:
 - .1 Steel Doors and Frames: Comply with DHI A115 series.
- .2 Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required in accordance with governing regulations:
 - .1 Standard Steel Doors and Frames: DHI's Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames.
 - .2 Custom Steel Doors and Frames: DHI's Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames.
- .3 Install each door hardware item in accordance with manufacturer's written instructions.
- .4 Coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way.
- .5 Install surface mounted items only when finishes have been completed on substrates involved, and as follows:
 - .1 Set units level, plumb, and true to line and location.
 - .2 Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - .3 Drill and countersink units that are not factory prepared for anchorage fasteners.
 - .4 Space fasteners and anchors according to industry standards.
- .6 Key Control System: Place keys on markers and hooks in key control system cabinet, as determined by final keying schedule.
- .7 Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, in equipment room; verify location with Consultant, and as follows:

- .1 Configuration: Provide one power supply for each door opening.
- .8 Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant in accordance with requirements specified in Section 07 92 00 – Joint Sealants.
- .9 Listed threshold at fire rated doors: Set thresholds in full bed of epoxy adhesive.

3.3 Site quality control

- .1 Independent Architectural Hardware Consultant: Owner will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
- .2 Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted, and as follows:
 - .1 Testing: Consists of Dynamic, static and system tests.
 - .2 Dynamic tests shall be conducted to before terminating devices to ensure door mechanics, sensors and locking devices mechanically functions correctly and free of grounds and shorts.
 - .3 Static tests shall be conducted before interconnecting devices to ensure all equipment functions correctly when energized.
 - .4 System tests shall be conducted to test system fully and to include fire alarm integration.

3.4 Closeout activities

- .1 Adjusting:
 - .1 Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and in accordance with referenced accessibility requirements:
 - .1 Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30°.

- .2 Electric Strikes: Adjust horizontal and vertical alignment of keeper to engage lock bolt.
- .3 Door Closers: Adjust sweep period so that, from an open position of 70°, the door will take at least 3 seconds to move to a point 75 mm from the latch, measured to the leading edge of the door.
- .2 Six Month Adjustment: Approximately six months after date of Substantial Performance, perform the following:
 - .1 Examine and readjust each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.
 - .2 Consult with and instruct Owner's personnel on recommended maintenance procedures.
 - .3 Replace door hardware items that have deteriorated or failed due to faulty design, materials, or installation of door hardware units.
- .2 Cleaning:
 - .1 Clean adjacent surfaces soiled by door hardware installation.
 - .2 Clean operating items as necessary to restore proper function and finish.

3.5 Protection

- .1 Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

End of section

1 General

1.1 Summary

- .1 This Section includes requirements for supply and installation of the following:
 - .1 Low energy swing operators.
- .2 Coordinating, purchasing, delivering, and scheduling of items specified in this Section is the responsibility of this Section.

1.2 Related requirements

- .1 Section 26 05 00 – Common Work Results for Electrical

1.3 Reference standards

- .1 The Aluminum Association (AA):
 - .1 AA DAF45-2003(R2009) Edition, Designation System for Aluminum Finishes
- .2 American National Standards Institute (ANSI)/ International Code Council (ICC)/ Builders Hardware Manufacturers Association (BHMA)/ Underwriters Laboratory Inc. (USA & CANADA)
 - .1 ANSI/ICC A117.1-2017, Accessible and Usable Buildings and Facilities
 - .2 ANSI/BHMA A156.10-2017, Power Operated Pedestrian Doors
 - .3 ANSI/BHMA A156.19-2019, Power Assist and Low-Energy Power-Operated Doors
 - .4 ANSI/CAN/UL 325 (2018): Electrical Door, Drapery, Gate, Louver, and Window Operators and Systems
- .3 American Society for Testing and Materials (ASTM):
 - .1 ASTM B221M-13, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)
- .4 Canadian Standards Association (CSA Group):
 - .1 CSA B651-18, Accessible design for the built environment

- .5 National Fire protection Association (NFPA)
 - .1 NFPA 101: Life Safety Code (2021)

1.4 Administrative requirements

- .1 Pre-Construction Meetings: Arrange a pre-construction meeting in accordance with Section 01 31 19 – Project Meetings.
- .2 Conduct pre-installation conference at Project site and review methods and procedures related to electrified door hardware including, but not limited to, the following:
 - .1 Review and discuss electrical roughing in and other preparatory work performed by other trades.
 - .2 Review sequence of operation for each type of electrified door hardware.
 - .3 Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - .4 Review required testing, inspecting, and certifying procedures.

1.5 Performance requirements

- .1 General: Provide door operators that have been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturer's corresponding standard systems.
- .2 Furnish and install surface mounted electro-mechanical swing door operator, consisting of electro-mechanical swinging door operator and electronic control, aluminum header, connecting hardware, and power on/off switch and safety sensor, and as follows:
 - .1 Automatic door equipment accommodates medium pedestrian traffic and up to 91 kg weight of doors, 1219 mm maximum door width.
 - .2 Operator capable of operating within temperature ranges of 35°C and +55°C.
 - .3 Automatic entrance equipment: comply with ANSI/BMHA A156.10 or ANSI/BMHA A156.19.

- .4 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.
- .5 Bearings: Fully lubricated and sealed to minimize wear and friction.
- .3 Opening Force requirements: Doors shall open with a manual force, not to exceed 133N to set the door in motion and 67 N to fully open the door applied at 25 mm from the latch edge of the door. The force required to prevent a stopped door from opening or closing shall not exceed 67 N measured 25 mm from the latch edge of the door at any point during opening or closing.
- .4 Closing Time:
 - .1 Doors shall be field adjustable to close from 90 degrees to 10 degrees in 3 seconds or longer as applicable per ANSI/BHMA A156.19.
 - .2 Doors shall be field adjusted to close from 10 degrees to fully closed in not less than 1.5 seconds.

1.6 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 indicating installation details, material descriptions, dimensions of individual components and profiles, and finishes.
 - .2 Shop Drawings: Submit shop drawings showing layout, profiles, wiring diagrams for electrified hardware, product components including anchorage, accessories, finish and glazing details (where required).

1.7 Project closeout submissions

- .1 Operation and Maintenance Data: Provide operations and maintenance information in accordance with Section 01 78 00 – Closeout Submittals.

- .2 Spare Parts (Tools): Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of materials listed in this Section.

1.8 Quality assurance

- .1 Qualifications: Provide proof of qualifications when requested by Consultant.
- .2 Manufacturer:
 - .1 Have (5) five years successful experience in the fabrication of automatic door operators of the type required for this project.
 - .2 Capable of providing field service representation during installation, approving acceptable installer and approving application method.
- .3 Installer: Have (5) five years successful experience in the installation of automatic door operators supplied by manufacturer.
- .4 Certifications: Provide the following during the course of the Work:
 - .1 Compliance Certification:
 - .1 Conform to ULC, NBC, NFC and OBC requirements, as applicable to hardware, for labelled or rated doors and frames, and for exiting, operation and function.
 - .2 Supply and install hardware products listed in the BHMA Directory of Certified Products, for this Project.

1.9 Delivery, storage, and handling

- .1 Delivery and Acceptance Requirements:
 - .1 Deliver hardware items in original factory containers, clearly labelling contents and scheduled use for this project.
 - .2 Inventory door operators on receipt and provide secure lock up for door hardware delivered to Project site.
- .2 Storage and Handling Requirements:
 - .1 Store hardware in a clean, well illuminated (500 lux minimum) securely locked storage room accessible only to authorized personnel.

- .2 Store hardware items on shelves (not on floors) separated and packaged as a group for each individual door with the door number, and list of items for that door on each package related to the door hardware schedule. Include basic installation instructions with each item or package.

1.10 Site conditions

- .1 Coordination:
 - .1 Coordinate with shop drawings of other work to confirm that adequate provisions are made for locating and installing door operators in accordance with indicated requirements.
 - .2 Coordinate with Division 26 for type of wire required for electronic hardware, schedule for installation, and connection to electronic hardware.
 - .3 Coordinate layout and installation of electrified door hardware with connections to power supplies fire alarm system and detection devices access control system security system building control system.

2 Products

2.1 Scheduled door hardware

- .1 Coordinate the work of all trades, hollow metal doors, metal frames, and electrical requirements covered in manufacturer's details and appropriate sections of the specifications.

2.2 Manufacturers

- .1 Acceptable Materials Manufacturers: Subject to compliance with requirements specified in this Section, manufacturers offering products that incorporated into the Work include the following:
 - .1 Assa Abloy
 - .2 DormaKaba
 - .3 Or approved alternate

2.3 Automatic swing door operators

- .1 Overhead surface applied design with electro mechanical low energy swing door operator enclosed in an aluminum header, door panels, jambs, connecting hardware, actuating controls, and On-Off-Hold Open Switch as indicated on the Drawings and specified below:
 - .1 Traffic Pattern: One way.
- .2 Door Operator: Open the door with a 1/8 HP motor through reduction gears, to the output shaft, and as follows:
 - .1 Low energy operator, door opening time: not be less than 4 seconds.
 - .2 The drive train shall have a positive, constant engagement. The operator shall stop the door in the open position by electrically reducing the motor voltage and stalling against a 90° stop.
 - .3 Close the door by spring energy; controlled by employing the motor as a dynamic brake.
 - .4 Door closing time shall not be less than 4.5 seconds.
 - .5 Pre-load closing spring for positive closing action at a low material stress level for long spring life.
 - .6 The operator shall function as a manual door closer in the direction of swing with or without electrical power.
- .3 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/BHMA A156.10 or ANSI/BHMA A156.19.
- .4 Operator Housing: Operator is completely contained in 152 mm deep x 152 mm high extruded aluminum housing with shop applied powder coat finish, colour white to match acoustic ceiling grid.
 - .1 Header Length: Custom, continuous width of corridor.
- .5 Connecting Hardware: Steel arm from the operator, mounted to the top face of the swing door, matte black powder coat finish.

- .6 Electrical Requirements: Provide 115-120 volts, 60 cycle, single phase, maximum 15 ampere service for 1-2 operators, 30 ampere service for 3-4 operators, and as follows:
 - .1 Coordinate with Division 26 for provision of service to each operator from junction box for multiple operators.
 - .2 Provide electrical conduit and wiring from specified controls to operators as outlined on manufacturer's drawings.
- .7 Operation:
 - .1 Automatic: Motion Sensor actuates door open; door closes after time delay expires. Opening and closing force, measured 25 mm out from the lock stile of the door, not to exceed 67 N of force to stop the door when operating in either direction. Operator to include the following variable adjustments so as to comply with ANSI/BHMA A156.19: Opening speed - 4 to 6 seconds; Closing speed - 4 to 6 seconds.
- .8 Acceptable Products:
 - .1 Assa Abloy SW200i, Single Pull, Surface Mounted Door Operator
 - .2 Or approved alternate

2.4 Activation devices

- .1 Power Door Operator Control: Located on each side of the opening device, as per ANSI/ICC A117.1.
 - .1 Activation Plate: Minimum 150 mm x 150 mm active microwave motion sensor with adjustable sensor zone from 100 mm to 610 mm, white finish with high contrast black waving hand icon and words "wave to open" and as follows:
 - .1 Acceptable Products:
 - .1 Assa Abloy Securitron WSS Hands Free Switch with Wave Sense Technology
 - .2 Or approved alternate

2.5 Materials, finishes, and fabrication

- .1 Extruded Aluminum: ASTM B221M, 6063-T5 alloy and temper, anodized:

- .1 Structural Header Sections: Minimum 3 mm thickness.
- .2 Structural Frame Sections: Minimum 3 mm thickness.
- .3 Structural Panel Sections: Commercial grade.
- .2 Finishes: For all exposed aluminum surfaces:
 - .1 Shop applied powder coat to match adjacent door frames, as approved by the Consultant.
- .3 Panel and frame construction: As recommended by manufacturer.

3 Execution

3.1 Examination

- .1 Verification of Conditions: Verify the following before beginning of installation of products specified in this Section:
 - .1 Examine doors and frames, with installer present, for compliance with requirements for installation tolerances, labelled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
 - .2 Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- .2 Installation of products specified in this Section will denote acceptance of site conditions.

3.2 Installation

- .1 Install automatic door operator equipment in accordance with manufacturer's written instructions.
 - .1 Install automatic door operator as indicated on Electrical Drawings.
- .2 Do not install surface mounted items until finishes have been completed on substrates involved, and as follows:
 - .1 Set units level, plumb, and true to line and location.
 - .2 Adjust and reinforce attachment substrates as necessary for proper installation and operation.

- .3 Drill and countersink units that are not factory prepared for anchorage fasteners.
- .4 Space fasteners and anchors according to industry standards.

3.3 Closeout activities

- .1 Adjusting:
 - .1 Initial Adjustment: Adjust and check all door operating hardware to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended.
 - .2 Six Month Adjustment: Approximately six months after date of Substantial Performance, perform the following:
 - .1 Examine and readjust door operator hardware as necessary to ensure function of doors.
 - .2 Consult with and instruct Owner's personnel on recommended maintenance procedures.
 - .3 Replace door hardware items that have deteriorated or failed due to faulty design, materials, or installation of door operator hardware.
- .2 Cleaning: Clean product surfaces and lubricate operating equipment for optimum condition and safety.

End of section

1 General

1.1 Summary

- .1 This Section includes requirements for supply and installation of interior glass for mirrors including accessories required for a complete and functional installation.

1.2 Reference standards

- .1 American Society for Testing and Materials (ASTM International):
 - .1 ASTM C1036-16, Standard Specification for Flat Glass
 - .2 ASTM C1503-18, Standard Specification for Silvered Flat Glass Mirror
- .2 Canadian General Standards Board (CGSB):
 - .1 CAN/CGSB 12.3-M91, Flat, Clear Float Glass
 - .2 CAN/CGSB 12.6-M91, Mirrors, Transparent (One-Way)
- .3 Glass Association of North America (GANA):
 - .1 GANA Glazing Manual
 - .2 GANA Mirrors: Handle with Extreme Care

1.3 Administrative requirements

- .1 Coordination: Coordinate work of this Section with the installation of adjacent material and allow for placement of surface mounted or recessed components from other specification sections.

1.4 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 description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.

- .2 Mirror Sample: Submit 300 mm x 300 mm square sample showing edge treatment on 2 adjoining edges.
- .3 Glazing Accessory Samples: Submit samples for each different mirror attachment accessories, and mirror mastic or adhesive.
- .3 Informational Submittals: Provide the following submittals during the course of the work of this Section:
 - .1 Mirror Mastic Compatibility Test Reports: Submit testing results showing indicating that mirror mastic or adhesive was tested for compatibility and adhesion with mirror backing and substrates on which mirrors are installed.

1.5 Project closeout submissions

- .1 Operation and Maintenance Data: Submit copies of manufacturer's written maintenance information for inclusion in the operations manual in accordance with Section 01 78 00 – Closeout Submittals; provide specific warning of any maintenance practice or materials that may damage or disfigure the finished Work.

1.6 Quality assurance

- .1 Qualifications: Provide proof of qualifications when requested by Owner:
 - .1 Installer: Use installers having experience with projects of similar scope and complexity as required for this project.
 - .2 Source Limitation: Obtain glass from a single source from a single manufacturer for each glass type, accessory product and installation method.

1.7 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 mirrors in accordance with mirror manufacturer's written instructions for storage and handling mirrors to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings, and as follows:
 - .1 Store indoors, protected from moisture including condensation.

- .2 Install mirrors as soon as possible after delivery to site.
- .3 Handle mirrors carefully to its place of installation.
- .4 Prevent damage to materials, adjacent materials and surfaces.

1.8 Site conditions

- .1 Ambient Conditions: Install mirrors only when ambient temperature and humidity conditions are maintained at levels required for final occupancy

1.9 Warranty

- .1 Special Warranty – Mirrors: Provide manufacturer's warranty covering deterioration and defects developed from normal use that are attributable to the manufacturing process for a period of five (5) years, covering defects in materials such as discolouration, black spots and clouding of the silvering film, commencing from date of Substantial Performance of the Work.

2 Products

2.1 Materials

- .1 Mirrors, Silvered: Meeting requirements of ASTM C1503 or CGSB 12.6 and as follows:
 - .1 Glass Quality: Q2 in accordance with ASTM C1036, or Mirror Glazing Quality in accordance with CGSB 12.3.
 - .2 Type: 1B - Float glass for high humidity use.
 - .3 Tint: Clear
 - .4 Thickness: 5 mm minimum
 - .5 Edges: Pencil polished edge. Seal edges to prevent chemical or atmospheric penetration of backing.
- .2 Accessory Materials: Provide accessory materials as required for complete installation and as follows:
 - .1 Edge Sealer: Coating compatible with mirrored coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.

- .2 Primer: Water resistant surface sealer formulated for priming porous substrates prior to application of mirror mastic, compatible with mirror mastic used for the project.
- .3 Wall Clip System: (6063-T6 Aluminum Z-clip system installed to mirror with integral adhesive tape, and anchored to wall using manufacturer's recommended fasteners, provide five (5) rows of clips per mirror, 300 mm long, equally spaced on back of mirror and as follows:
 - .1 Basis of Design Product: Monarch Metal Inc., MFTape system or approved alternate.
- .4 Anchors and Inserts: Provide devices as required for mirror hardware installation.
- .5 Frame: Custom maple frame in accordance with Section 06 20 00 - Finish Carpentry and Millwork.

2.2 Fabrication

- .1 Mirror Sizes: Fabricate mirrors to fit measurements of finished spaces, confirm site measurements at the site before fabricating mirrors and as follows:
 - .1 Cut to produce clean, straight edges with no chips, cracks or flaws.
 - .2 Fabricate mirrors from a single piece for widths 1220 mm or less in width; horizontal joints are not permitted.
- .2 Cut Outs: Make any cut outs, notches and holes in mirrors to suit site conditions and products installed by other sections of the work; locate cut outs so they fit closely around penetrations in mirrors.

3 Execution

3.1 Examination

- .1 Pre-Construction Mirror Mastic Compatibility Test: Test mirror mastic products to determine compatibility of mastic with mirror backing and substrates on which mirrors are installed before starting any work of this Section; start of work will indicate acceptable testing, submit certificate indicating that mastic or adhesive obtained satisfactory bond between mirror backing and substrate materials.
- .2 Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance.
 - .1 Verify compatibility with and suitability of substrates, including compatibility of mirror mastic with existing finishes or primers.
 - .2 Proceed with mirror installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 Installation

- .1 Install in accordance with the manufacturer's written instructions and the contract documents, plumb, true, level and rigid and in accordance with GANA Glazing Manual and GANA Mirrors: Handle with Extreme Care; most restrictive requirements govern in the case of a conflict between manufacturer's instructions and referenced GANA documents and as follows:
 - .1 Maintain a minimum 3 mm air space between back of mirrors and face of mounting surface to allow for air circulation behind mirrors.
 - .2 Prime substrates when required by mirror mastic manufacturer's written installation requirements
 - .3 Permanently support bottom edge of mirrors with clips spaced at quarter points and install top clips as required by mirror mastic manufacturer; place bearing pads between metal clips and mirror glass to prevent metal to glass contact.
 - .4 Align mirrors; in multiple application, to a parallel and true plane surface to produce a true reflection across all sections with edges plumb and level.

- .5 Mount mirrors above wet counters and backsplash tops with a minimum 6 mm gap between bottom of mirror and potentially wet service conditions.

3.3 Protection

- .1 Do not permit edges of mirrors to be exposed to standing water during installation.
- .2 Maintain environmental conditions that will prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.
- .3 Protect mirrors from breakage and contaminating substances resulting from construction operations.

End of section

1 General

1.1 Summary

- .1 This Section includes requirements for testing and preparation of concrete slabs to receive applied flooring products and that require additional preparation to meet substrate requirements described by manufacturers of flooring finishes specified in various Division 09 Specifications.

1.2 Reference standards

- .1 American Society for Testing and Materials (ASTM):
 - .1 ASTM F2170-19, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
 - .2 ASTM F3191-16, Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring
- .2 National Floor Covering Association of Canada (NFCA):
 - .1 NFCA Floor Covering Reference Manual

1.3 Administrative requirements

- .1 Coordination: Coordinate compatibility of Products specified in this Section with adhesive Products specified in Division 9; successful implementation of flooring preparation requires input and coordination from project participants as follows:
 - .1 Owner: Owner provides specifications describing performance requirement for floor substrates necessary to achieve flooring manufacturers written requirements for successful installation of flooring Products.
 - .2 Contractor: Contractor prepares or adds content to their quality management program that includes construction actions and testing procedures that monitor floor flatness, moisture emissions and alkalinity of concrete substrates prior to installation of flooring Products and methods to ensure corrective actions recommended by third-party concrete moisture testing agency, and as directed by Owner are implemented.

- .3 Subcontractor: Subcontractor provides floor levelling and preparation described in this Section to meet flooring manufacturer's required floor flatness.
- .2 Pre-Construction Meetings: Arrange for Pre-Construction Meeting in accordance with Section 01 31 19 – Project Meetings with Owner, Contractor, Subcontractors and suppliers affected by work of this Section to discuss installation requirements including the following:
 - .1 Condition of Substrates: Substrate conditions being acceptable to flooring manufacturers requirements for relative humidity, mechanical bond and porosity, flatness and other conditions affecting quality of applied flooring installation.
 - .2 Testing Requirements: Frequency of site testing and observation reporting of flooring substrates to confirm acceptability for manufacturers installation requirements.
 - .3 Best Practices: Best practices relating to workmanship and installation processes as follows:
 - .1 Responsibility for completion of existing conditions testing performed by Contractor prior to start of Subcontractor work for this Section.
 - .2 Installation follow-up procedures to reduce or eliminate installation deficiencies.
 - .3 Sequence of work and confirmation of compatibility of installed materials and substrates.
 - .4 Use of trained installers for critical components.
 - .4 Other conditions affecting quality of installation identified during course of the Work for the Project.
 - .5 Provide minimum 72 hours to Owner before starting work of this Section; increase notice period when notification period spans weekends or statutory holidays.

1.4 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 for Products specified indicating physical properties, performance characteristics, acceptability of substrates, application limitations and required testing.

1.5 Quality assurance

- .1 Installation Requirements: Install floor preparation materials and flooring products in accordance with NFCA Floor Covering Reference Manual and manufacturer's written instructions.
- .2 Qualifications: Provide proof of qualifications when requested by Owner during the course of the Work of this Section:
 - .1 Manufacturer: Obtain specified Products through one source from a single manufacturer or using materials from a secondary source that are acceptable to the manufacturer.
 - .2 Installer: Install using personnel that have completed a registered floorcovering installer apprentice program or meet requirements of NFCA Trade Qualifications, and who are experienced with installation of flooring preparation Products required for the project.
- .3 Certifications: Provide proof of the following during the course of the Work:
 - .1 Compatibility Certificate: Provide letter from flooring adhesive manufacturers stating that Products proposed for use on the Project are compatible with flooring substrates, flooring preparation and flooring described in Related Requirements.

1.6 Quality control

- .1 Owner's Responsibility: Owner will require changes to the Work when Contractor's inspection agency indicates adverse moisture conditions or alkalinity, deficiencies floor flatness or surface condition, or inconsistent preparation of flooring substrates and flooring materials.

- .2 Contractor's Responsibility: Contractor will pay for inspection and testing required to validate acceptable concrete slab condition for moisture content and initial flatness prior to Subcontractor start of work; Contractor will not perform any duties of the Owner, and as follows:
 - .1 Contractor's Inspection Agency: Third-party inspection agency will provide qualified personnel to perform required inspections and tests; scope of service provided by the inspection agency will be limited to the following:
 - .1 Prompt notification of Owner and Contractor of irregularities or deficiencies observe during the performance of its duties.
 - .2 Inspection agency us not authorized to release, revoke, alter or enlarge requirements of the Contract Documents, nor approve or accept any portion of the Work; inspection agency will report findings to the Owner and Contractor.
 - .3 Contractor's inspection agency will not be permitted to perform any duties of the Owner or Contractor.
 - .3 Subcontractor's Responsibility: Subcontractor will pay for inspection and testing associated with installation of Products specified in this Section including porosity and alkalinity, and other conditions affecting completed work of this Section.

1.7 Site conditions

- .1 Ambient Conditions: Maintain air temperature and substrate temperature in accordance with manufacturer's printed installation instructions, generally between 10°C and 35°C before application and for 72 hours after application.

2 Products

2.1 Manufacturers

- .1 Acceptable Products Manufacturers: Subject to compliance with requirements specified in this Section; where multiple listings of manufacturers occur, use any of the following listed manufacturers' Products:

- .1 UZIN UTZ
 - .2 Ardex Engineered Cements
 - .3 MAPEI Canada Inc.
 - .4 Sika Canada Ltd.
 - .5 W.R. Meadows of Canada
 - .6 Custom Building Products
 - .7 Or approved alternate
- .2 Substitutions: Owner may consider additional manufacturers having similar products to Acceptable Products Manufacturers listed above during the construction period, provided they meet the performance requirements established by the named Products and provided they submit requests for substitution:
- .1 Do not use substitute materials to establish Bid Price.
 - .2 Apparent Substitutions that appear as a part of the Project without review and acceptance by the Owner will be rejected and replaced with one of the specified Products.

2.2 Performance requirements

- .1 Required Flatness: Final measurements for required flatness of substrates prior to installation of flooring materials is established by materials described in Division 9.

2.3 Patching and levelling materials

- .1 Overlayment: Cementitious, self levelling, single component, polymer modified overlayment, for application thicknesses to a minimum of 13 mm to 25 mm; as follows:
 - .1 Acceptable Products
 - .1 UZIN Utz North America Inc, Uzin NC-150
 - .2 MAPEI Canada Inc., Ultratop
 - .3 Sika Canada Ltd., Sikafloor Level 25
 - .4 W.R. Meadows of Canada, Sure-Flo FT 100
 - .5 CustomTech, TechLevel HPT

- .6 Or approved alternate
- .2 Underlayment: Cementitious, self-levelling, single component, polymer modified underlayment with manufacturer's recommended primer and crack repair materials; for application thicknesses to a minimum feather edge to 13 mm; interior grade and as follows:
 - .1 Acceptable Products:
 - .1 UZIN NC-150
 - .2 Ardex K 15 Premium Self Levelling Underlayment
 - .3 MAPEI Novoplan® 2 Plus
 - .4 Sika Sikafloor Level 125
 - .5 W.R. Meadows Sure-Flo ST
 - .6 CustomTech, TechLevel 150 Self-levelling underlayment
 - .7 Or approved alternate
 - .3 Patching and Flash Patching Materials: Cementitious based, polymer modified, fine aggregate, single component, rapid curing, early strength floor patching compounds having high adhesion with manufacturer's recommended primer and surface profile; for application in thicknesses from 4 mm to 25 mm, and as follows:
 - .1 Acceptable Products:
 - .1 UZIN NC-182
 - .2 Ardex SD-P
 - .3 MAPEI Mapecem 101
 - .4 Sika SikaQuick 1000
 - .5 W.R. Meadows Sealtight Meadow-Crete H
 - .6 CustomTech, Tech Patch-MP
 - .7 Or approved alternate
 - .4 Fine Finish Flash Patching Materials: Cementitious based, polymer modified, fine aggregate, single component, ultra-fast drying, early strength floor patching compounds having high adhesion with manufacturer's recommended primer and surface profile; for application in thicknesses from 0 mm to 6 mm, and as follows:

- .1 Acceptable Products:
 - .1 UZIN NC 886
 - .2 Ardex SD-F Feather Finish®
 - .3 MAPEI Planipatch®
 - .4 Sika Sika® Level SkimCoatCA
 - .5 W.R. Meadows Sealtight Meadow-Patch® T1
 - .6 Or approved alternate

2.4 Accessories

- .1 Primer: Product compatible with and as recommended by patching and levelling Product manufacturer.

3 Execution

3.1 Examination

- .1 Contractor's Pre-Installation Testing: Verify that concrete substrates are free of negative hydrostatic pressure, excessive moisture and alkalinity by testing in accordance with ASTM F710 and ASTM F2170, and as follows:
 - .1 Verify that concrete floors are dry by using test methods acceptable to flooring manufacturer, and exhibit negative alkalinity, carbonization or dusting.
 - .2 Verify that substrates are sound, level, free of cracks greater than 3 mm in width, and changes in elevation that may adversely affect installation.
- .2 Subcontractor's Verification of Conditions: Verify that concrete substrates are acceptable for installation of Products before starting any work of this Section.
 - .1 Verify that concrete substrates are sound and acceptable for bonding ability by measuring water absorption in accordance with ASTM 3191.
 - .2 Installation of Products specified in this Section will denote acceptance of site conditions.

3.2 Preparation

- .1 Surface Preparation: Substrates must be structurally sound, dry, solid and stable in accordance manufacturer's written instructions, free from dust, dirt, oil, grease, paint, curing agents, concrete sealers, latex compounds, loosely bonded toppings, loose particles, laitance, adhesive residue, and any other substance or condition that may prevent or reduce adhesion and as follows:
 - .1 Fill any cracks, holes, and depressions in substrates using trowellable levelling and patching compounds.
 - .2 Level and patch as required for correcting floor surface finish to within flooring manufacturers tolerances for flatness.
 - .3 Allow for variance from specified tolerance to account for plastic settlement of concrete slabs.
 - .4 Notify Owner and Contractor when existing conditions are substantially different than those specified, and additional levelling materials are required to achieve specified floor flatness.

3.3 Underlayment and overlayment Installation

- .1 Mixing: Mix in a clean mixer in accordance with manufacturer's written instructions. Use appropriate mixing and delivery method in accordance with area to receive underlayment and overlayment and as follows:
 - .1 Periodically clean pump in accordance with manufacturer's written instructions when pump mixing is used.
 - .2 Do not overwater.
 - .3 Thoroughly mix to a homogenous, smooth, lump-free consistency.
 - .4 Do not overmix; which could cause air to become trapped, shortening the pot life or cause pin-holing during application and curing.
- .2 Application: Place Product in a ribbon pattern to achieve a continuous flow of wet material to avoid trapping air or creating a cold joint and as follows:
 - .1 Set width of pour that is ideal for maintaining a wet edge throughout placement; adjust width of pour to maintain wet edge.

- .2 Immediately after placing Product, spread with gauge rake; smooth surface after achieving required thickness.

3.4 Patching and flash patching Installation

- .1 Mixing: Mix in a clean container in accordance with manufacturer's written instructions and as follows:
 - .1 Do not overwater.
 - .2 Thoroughly mix with low-speed mixer (at about 300 rpm) to a smooth, lump-free consistency.
 - .3 Do not mix more material than can be applied within 8 to 10 minutes.
 - .4 Avoid air entrapment and prolonged mixing, which will shorten pot life.
- .2 Application: Use manufacturer recommended flat-edge steel trowel and as follows:
 - .1 Apply mixed patching and levelling Products to substrate to required thickness; to manufacturer's maximum single-coat thickness.
 - .2 Blend into surrounding area and finish to required smoothness.

3.5 Protection

- .1 Protect from traffic dirt or dust from other trades until the final installation of the floor covering.
- .2 Allow for extended periods of cure and protection when temperatures drop below 16°C or when relative humidity is higher than 70%.

End of section

1 General

1.1 Summary

- .1 The interior materials and finishes listed in this Section complement and complete other technical sections that make reference to this Section.

1.2 Related requirements

- .1 Related requirements include all sections that make reference to this section and sections that are listed in the Schedule below.

1.3 Definitions

- .1 Exposed Surfaces: Apply listed finishes to all visible surfaces viewed from normal viewing conditions except top of horizontal surfaces located 2100 mm or more above finished floor level unless visible from above.
- .2 Semi-Exposed Surfaces: Apply listed finishes to bottom of horizontal surfaces that are located below 1100 mm above finished floor, that are visible from offset angles, reflections or through openings in adjacent construction.
- .3 Concealed Surfaces: Listed finishes will not be required on surfaces that are fully enclosed or concealed from view in final construction except for identification marks or protection coating specified in other Sections of the Project Manual.

1.4 Administrative requirements

- .1 Substitutions: Refer to related technical specification sections for additional requirements before submitting request for substitution to the Owner; Project Manual contains definitions for Acceptable Products:
 - .1 Materials selected for inclusion in the Schedule below indicate the established quality, aesthetic criteria and colour palette for this project and form the basis for Acceptable Products listed in the technical specification sections.
 - .2 Owner recognizes that there may be other materials that perform similarly to the listed materials, and that variations in a substitute material's appearance may not exclude its use for this Project.

- .3 Owner may consider substitute products meeting or exceeding the properties of the named products provided that any materials offered as a substitution match the technical standard, colour, tone and pattern of the specified products sufficiently such that the established aesthetic criteria are maintained without adjusting other materials on the colour palette.
- .4 Substitute materials shall not change the overall appearance, thickness or compatibility with other products associated with the assembly; and shall not require rebalancing of the Scheduled Finishes.
- .5 Technical specification sections may list additional Acceptable Products and acceptance criteria for Acceptable Products.
- .2 Coordination: Confirm with Owner before starting finishing of any material; general finishing coordination requirements follow:
 - .1 Walls: Finish reveals and recesses the same as adjacent finishes, unless indicated as a contrasting colour or as an exposed metal finish.
 - .2 Doors and Frames: Paint metal door frames differently than walls in which they occur with doors the same.
 - .3 Floors: Make changes to floor finishes occurring within doorways at centreline of door when door is in a closed position; refer to Drawings for specific layouts of carpet borders, vinyl tile and sheet flooring.
 - .4 Painting: Refer to Drawings for location of accent paint; paint miscellaneous metal fabrications to match adjacent finishes.

2 Products

2.1 Schedules

- .1 The following Schedules apply to interior finish materials listed in referenced Technical Specification Sections.

2.2 Interior materials and finishes schedule

- .1 Section 06 61 16 - Solid Surfacing Fabrications
 - .1 Solid Surfacing (SF):
 - .1 SF-1: Solid Surface countertop: Corian Solid Surface, Modern White, Polished, or approved alternate.
- .2 Section 09 30 00 – Tiling:
 - .1 Ceramic Tile (TL):
 - .1 TL-1: Olympia Tile, Essential Series, Colour: White, Matte Finish, 30 cm x 60 cm, Grout Colour: TBC, or approved alternate.
 - .2 TL-2: Olympia Tile, Essential Series, Colour: Graphite, Matte Finish, 30 cm x 60 cm, Grout Colour: TBC, or approved alternate.
 - .3 TL-3: Olympia Tile, Essential Series, Colour: Grey, Matte Finish, 30 cm x 60 cm, Grout Colour: TBC, or approved alternate.
 - .2 Tile Trim:
 - .1 ET-4, ET-5: Transition Edge Strip: Extruded aluminum edge strips for same height transitions; height as required to suit flooring installation; with integral perforated anchoring leg for setting the strip into the setting material, satin nickel finish and as follows:
 - .1 Acceptable Materials:
 - .1 Schlüter Schiene
 - .2 Or approved alternate
 - .2 ET-7: Transition Edge Strip: Extruded aluminum edge strips for vertical transitions; height as required to suit tile installation; with integral perforated anchoring leg for setting the strip into the setting material, satin nickel finish and as follows:
 - .1 Acceptable Materials:
 - .1 Schlüter Jolly
 - .2 Or approved alternate

- .3 ET-8: Transition Edge Strip: Extruded aluminum edge strips for vertical transitions; height as required to suit tile installation; with integral perforated anchoring leg for setting the strip into the setting material, satin nickel finish and as follows:
 - .1 Acceptable Materials:
 - .1 Schlüter RENO-RAMP/-K
 - .2 Or approved alternate
- .3 Section 09 68 13 – Tile Carpeting:
 - .1 Carpet Tile (CPT):
 - .1 CPT-1: Tarkett, Braided 11439, Welded 55105, size, 24” x24”, or approved alternate.
- .4 Section 09 91 00 – Painting:
 - .1 Paint (PT), Products and Acceptable Manufacturers as indicated in Section 09 91 00, match colour schedule as follows:
 - .1 PT-1 – Field Paint: Benjamin Moore, Chantilly Lace 2121-70
 - .2 PT-2 – Accent Paint Green: Benjamin Moore Absolute Green 2043-10
 - .3 PT-3 – Accent Paint Burnt Yellow: Benjamin Moore Spicy Mustard 2154-20
 - .4 PT-4 – Accent Paint Burnt Orange: Dulux Baked Bean DLX1066-7
 - .5 PT-5 – Accent Paint Light Blue: Benjamin Moore Broken Blue CW-600
 - .6 PT-6 – Accent Paint Navy (to match Durham blue PMS2955C): Benjamin Moore Symphony Blue 2060-10
 - .7 PT-7 – Accent Paint (doors, door frames & sky lights): Benjamin Moore, Stormy Monday 2112-50
- .5 Section 10 21 13 Toilet Compartments:
 - .1 Match colours as follows from Bobrick Duraline:
 - .1 Front Panels and Doors: Danish Maple 8906-58
 - .2 Side Panels: Moonstone 7872-58

3 Execution – not used

End of section

1 General

1.1 Section includes

- .1 Requirements for tile backing boards.

1.2 Related requirements

- .1 Section 07 92 00 – Joint Sealants
- .2 Section 09 29 13 – Gypsum Boards: Gypsum board installed adjacent to backing boards.
- .3 Section 09 30 00 – Tiling: Backing boards for tiling substrates.

1.3 Definitions

- .1 Refer to ASTM C11 for definitions of terms for gypsum board and related building materials not defined in this Section or in other referenced standards.

1.4 Site conditions

- .1 Ambient Conditions: Maintain rooms, surfaces and materials within required temperature range before, during and after application in accordance with ASTM C840 and manufacturer's written requirements.

2 Products

2.1 Manufacturers

- .1 Acceptable Products Manufacturers: Subject to compliance with performance requirements specified in this Section, use any of the listed manufacturers' products in accordance with Section 01 61 00 – Common Product Requirements; following manufacturer's do not require submission of a request for substitutions provided required shop drawing and product data submissions are submitted before starting any work of Section:
 - .1 CertainTeed Gypsum of Canada
 - .2 CGC Interiors, A USG Company
 - .3 Custom Building Products Ltd.

- .4 Georgia-Pacific Canada, Inc.
- .5 Or approved alternate
- .2 Substitutions: Owner may consider additional manufacturers having similar products to Acceptable Products and Acceptable Alternative Products during the construction period, provided they meet the performance requirements established by the named:
 - .1 Do not use substitute materials to establish Bid Price.
 - .2 Substitutions that appear as a part of the project without review and acceptance by the Owner will be rejected, and replaced with systems using specified materials.

2.2 Regulatory requirements

- .1 Regulatory Requirements: Fire-resistance ratings described on the Drawings and within this Section are based on material contributions listed in the Building Code; provide materials and construction identical to those described in the listed assemblies, or provide proof of performance as evidenced through an independent testing and inspection agency for materials that differ showing identical or better performance acceptable to the Authorities Having Jurisdiction as follows:
 - .1 Fire-Resistance Rated Assemblies: Provide submittals for assembly solutions using manufacturer's proprietary Products.
 - .2 Performance Requirements: Use only Products that form a part of a fire-resistance rated assembly tested and listed in accordance with assemblies noted on the drawings.
 - .3 Acceptable Substitutions: Type X Products specified in this Section can be substituted by Type C Products when supported by manufacturer specific ULC Assembly and Materials Listing is submitted to the Owner prior to starting work of this Section.
 - .4 Whole System Compliance: Products installed on site and forming a ULC Listed Assembly must match tested assembly; mixing of different manufacturer's Products from those described in the ULC Listed Assembly will not be permitted unless accompanied by an Engineering Judgement from all manufacturers.

- .2 Sound Transmission Characteristics: Provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by a qualified independent testing agency for STC ratings of specific assemblies indicated on Drawings and as follows:
 - .1 Sound Ratings: Sound ratings described on the Drawings and within this Section are based on generic material contributions listed in the Building Code and Gypsum Association GA 600, Fire Resistance Manual or the Building Code Fire and Sound Resistance Tables and Appendices.
 - .2 Product Limitations: Provide materials and construction identical to those described in the listed assemblies; or,
 - .3 Compliance Requirements: Provide proof of acoustical performance using alternative proprietary Products showing compliance with fire-resistance ratings and STC-Ratings in accordance with ASTM E90 and Apparent Sound Transmission Class (ASTC-Ratings) in accordance with Building Code, Section 5.8 Sound Transmission.

2.3 Performance requirements

- .1 Backing Board Sizes: Provide backing boards in maximum lengths and widths available that minimize joints in each area and correspond with support system as indicated on Drawings, with long edges tapered and using thicknesses indicated on Drawings.

2.4 Materials

- .1 Gypsum Board: Refer to Section 09 29 13.
- .2 Gypsum Backer Boards: Glass mat faced gypsum board meeting requirements of ASTM C1178 with mould resistant facers meeting a rating of 10 (zero mould growth) in accordance with ASTM D3273; and as follows:
 - .1 Fire Rating: Use Type-X tile backer gypsum board when assembly requires fire rating.
 - .2 Acceptable Products:
 - .1 CertainTeed, Diamondback GlasRoc Tile Backer

- .2 CGC, Durock Glass-Mat Tile Backerboard
- .3 Georgia-Pacific, DensShield Tile Backer
- .4 Or approved alternate

2.5 Accessories

- .1 Steel Self-Drilling Screws: Self-drilling screws in accordance with ASTM C954 for fastening backing boards to steel members from 0.80 mm to 2.67 mm nominal core metal thickness, and as follows:
 - .1 Type S: Shallow pitch screw; used for single layer backing board application.
- .2 Steel Sheet Backing Plates: Steel sheet for blocking and bracing in length and width indicated on Drawings; 1.2 mm nominal core metal thickness x minimum 400 mm wide in accordance with ASTM C645 requirements for metal and with ASTM A653, Z120, hot dip galvanized zinc coating.
- .3 Joint Tape: Joint tape meeting requirements of ASTM C475, Type as recommended by backing board manufacturer for type of installation; use only mould resistant materials.
- .4 Joint Compound: Mould resistant joint compound and accessory materials in accordance with ASTM C475; for each coat use formulation that is compatible with other compounds applied on previous or for successive coats and as follows:
 - .1 Pre-Filling: Setting type joint compound.
 - .2 Embedding and First Coat: Setting type joint compound.
- .5 Sealant: Refer to Section 07 92 00.

3 Execution

3.1 Examination

- .1 Verify that partition components, substrates and framing, and other conditions affecting installation are satisfactory before starting installation.
 - .1 Proceed with installation only after unsatisfactory conditions are corrected.

3.2 Preparation

- .1 Mould Prevention: Do not install gypsum-based backing boards that are wet, that have been damaged by moisture, or that have evidence of mould growth such as fuzzy surfaces or dark splotchy surfaces and discolouration:
 - .1 Keep backing boards dry throughout installation.
 - .2 Do not install backing boards over other building materials where conditions exist that are favourable to mould growth.
 - .3 Install backing boards installed on walls with a minimum 6 mm gap between bottom edge of board and floor surface.

3.3 Installation

- .1 Movement Control Joints: Form control joints to account for thermal movements, to account for movement where direction of framing changes direction, and movements arising differing substrate materials using V-Shaped trims by framing back-to-back framing members and a break in backing boards at a maximum of 7.5 metres o/c, as follows:
 - .1 Install control joints in partition construction in accordance with ASTM C840 so that gross area enclosed by joints does not exceed 80 m² between joints with a maximum single dimension between joints of 9 metres.
 - .2 Lay out control joints to coincide as far as possible with door, window or screen frames, but not necessarily to occur at every individual frame; install control joints vertically from corners of openings.
 - .3 Provide continuous dust barrier behind joints.
 - .4 Install joints straight and true.
 - .5 Form control joints to meet sound rated construction and fire ratings required for remainder of partition construction.
 - .6 Obtain Owner's acceptance of control joint layout before starting installation of materials specified in this Section.
- .2 Backing board Application: Install backing boards in accordance with ASTM C840 and manufacturer's written instructions and as follows:
 - .1 Single Layer Application:

- .1 On partitions, apply backing boards horizontally to minimize end joints.
- .2 Stagger abutting end joints not less than one framing member in alternate courses of board.
- .3 Apply backing boards to supports using Type S screws fastened 10 mm from edges of board with screws long enough to penetrate 10 mm into metal framing.
- .2 Install sheet metal backing continuously where reinforcement is required for accessories hung from backing board assemblies and as follows:
 - .1 Butt joints between adjoining metal sheets.
 - .2 Form sheet metal extending 150 mm on each side of partition corners without joints where metal backing is continuous around corners.
 - .3 Spot glue first backing board layer at 150 mm o/c to metal backing to hold in place before mechanically fastening surface layer of backing boards in a two layer installation.
- .3 Install backing boards to produce a flat surface; shim surfaces to produce a uniform plane across backing board surfaces where tile backing boards abut other types of panels in the same plane.
- .3 with specified requirements where fasteners and anchors are removed and replaced.

3.4 Closeout activities

- .1 Adjusting: Repairs: Touch-up minor damage to backing boards in accordance with manufacturer's instructions; remove and replace backing boards that cannot be successfully repaired.

End of section

1 General

1.1 Summary

- .1 This Section includes requirements for supply and installation of interior gypsum board for partitions, ceilings, and bulkheads.

1.2 Related requirements

- .1 Section 06 10 53 – Miscellaneous Rough Carpentry: Wood blocking.
- .2 Section 07 92 00 – Joint Sealants: Control joint sealants, acoustic sealants and air seal sealants.
- .3 Section 08 11 13 – Steel Doors and Frames: Installation of steel door frames in gypsum board systems.
- .4 Section 09 91 00 – Painting

1.3 Definitions

- .1 Levels of Finish: Standard levels of finish in accordance with apply to products of this Section as follows, and are used to designate required finish levels for indicated areas:
 - .1 Level 0: Not Used
 - .2 Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, unless a higher level of finish is required for fire resistance rated assemblies and sound rated assemblies.
 - .3 Level 2: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges where panels are substrate for tile.
 - .4 Level 3: Not Used
 - .5 Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view.
- .2 Refer to ASTM C11 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.4 Reference standards

- .1 American Society for Testing and Materials (ASTM International):

- .1 ASTM A653/A653M-18, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- .2 ASTM B221-14, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
- .3 ASTM C11-18b, Standard Terminology Relating to Gypsum and Related Building Materials and Systems
- .4 ASTM C423-17, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
- .5 ASTM C473-17, Standard Test Methods for Physical Testing of Gypsum board Products
- .6 ASTM C475/C475M-17, Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board
- .7 ASTM C645-18, Standard Specification for Nonstructural Steel Framing Members
- .8 ASTM C834-17, Standard Specification for Latex Sealants
- .9 ASTM C840-18b, Standard Specification for Application and Finishing of Gypsum Board
- .10 ASTM C919-18, Standard Practice for Use of Sealants in Acoustical Applications
- .11 ASTM C954-18, Standard Specification for Steel Drill Screws for the Application of Gypsum board Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.75 mm) to 0.112 in. (2.84 mm) in Thickness
- .12 ASTM C1002-18, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum board Products or Metal Plaster Bases to Wood Studs or Steel Studs
- .13 ASTM C1047-14a, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
- .14 ASTM C1396/C1396M-17, Standard Specification for Gypsum Board
- .15 ASTM C1629/C1629M-18a Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum board Products and Fiber-Reinforced Cement Panels

- .16 ASTM C1658/C1658M-18, Standard Specification for Glass Mat Gypsum boards
- .17 ASTM D3273-16, Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
- .18 ASTM E90-09(2016), Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
- .19 ASTM E413-16, Classification for Rating Sound Insulation
- .2 Ontario Building Code:
 - .1 Fire Ratings and Sound Transmission Ratings, generic listings used to establish basic performance of specified materials and assemblies on Drawings and in Specifications.
- .3 Gypsum Association (GA):
 - .1 GA-214-2015, Recommended Levels of Gypsum Board Finish
 - .2 GA-238-2016, Guidelines for Prevention of Mould Growth on Gypsum Board
 - .3 GA-600-2015, Fire Resistance Design Manual
- .4 Underwriters Laboratories of Canada (ULC):
 - .1 CAN/ULC S102-11, Surface Burning Characteristics of Building Materials and Assemblies
 - .2 CAN/ULC S114-05, Test for Determination of Non-Combustibility in Building Materials
 - .3 ULC S702.1-2016, Standard for Mineral Fibre Thermal Insulation for Buildings, Part 1: Material Specification
 - .4 Underwriters' Laboratories of Canada (ULC), List of Equipment and Materials, Fire Resistance Ratings

1.5 Administrative requirements

- .1 Pre-Construction Meeting: Conduct a pre-construction meeting in accordance with Section 01 31 19 – Project Meetings, to confirm surface preparation performed by this Section and required by Section 09 91 00 – Painting attended by the Contractor, Consultant, gypsum board Subcontractor and painting Subcontractor as follows:
 - .1 First Meeting: Confirm general acceptance of surfaces of gypsum board after completion of final taping and surface preparation and before application of prime paint performed by Section 09 91 00, with identification of any discrepancies that have potential to affect installation of specified paints and coatings.
 - .2 Second Meeting: Confirm any touch-ups to gypsum board deficiencies that become visible after application of prime paint and before application of finish coats.
 - .3 Limitation of Meetings: Pre-construction meeting is needed to confirm installation discrepancies and deficiencies that only become apparent after application of painting and coating materials; repairs identified as being caused by impact or inattention by other subcontractors will be at the Contractor's expense, or as transferred to the responsible parties.

1.6 Submittals

- .1 Provide required information in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Action Submittals: Provide following submittals before starting any work of this Section:
- .3 Informational Submittals: Provide following submittals during the course of the Work:
 - .1 Fire Rating Product Data: Submit manufacturer's product data indicating compliance with deflection, loading and fire resistance ratings a minimum of thirty (30) working days before starting work of this Section, and as follows:

- .1 Identify any changes to standard systems, materials and assemblies that may be required to meet project requirements as described under Regulatory Requirements.
- .2 Submit copies of ULC Assembly and Materials Listings indicating ULC Listings meeting design criteria for assemblies described in this Section.
- .2 Acoustic Ratings: Submit STC listings for assemblies based on manufacturer's testing and actual materials used for project; sound ratings of proposed assemblies are required to meet or exceed the acoustical performance listed on Drawings.

1.7 Delivery, storage, and handling

- .1 Protection from Mould and Mildew: Protect gypsum board from conditions that have probability of inoculating or causing mould growth during transportation and delivery, storage and handling, and installation in accordance with Gypsum Association GA-238.

1.8 Site conditions

- .1 Ambient Conditions: Maintain room, surface and material within temperature range and for duration before, during and after application in accordance with ASTM C840 and manufacturer's written requirements.

2 Products

2.1 Manufacturers

- .1 Acceptable Products Manufacturers: Subject to compliance with performance requirements specified in this Section, use any of the listed manufacturers' products in accordance with Section 01 61 00 – Common Product Requirements; following manufacturer's do not require submission of a request for substitutions provided required shop drawing and product data submissions are submitted before starting any work of Section:
 - .1 CertainTeed Gypsum of Canada
 - .2 CGC Interiors, A USG Company
 - .3 Georgia-Pacific Canada, Inc.

- .4 Or approved alternate
- .2 Substitutions: Consultant may consider additional manufacturers having similar products to Acceptable Products and Acceptable Alternative Products during the construction period, provided they meet the performance requirements established by the named products:
 - .1 Do not use substitute materials to establish Bid Price.
 - .2 Substitutions that appear as a part of the project without review and acceptance by the Consultant will be rejected, and replaced with systems using specified materials.

2.2 Regulatory requirements

- .1 Regulatory Requirements: Fire-resistance ratings described on the Drawings and within this Section are based on material contributions listed in the Building Code; provide materials and construction identical to those described in the listed assemblies, or provide proof of performance as evidenced through an independent testing and inspection agency for materials that differ showing identical or better performance acceptable to the Authorities Having Jurisdiction as follows:
 - .1 Fire-Resistance Rated Assemblies: Provide submittals for assembly solutions using manufacturer's proprietary Products.
 - .2 Performance Requirements: Use only Products that form a part of a fire-resistance rated assembly tested and listed in accordance with assemblies described in ULC List of Equipment and Materials, Fire Resistance Ratings.
 - .3 Acceptable Substitutions: Type X Products specified in this Section can be substituted by Type C Products when supported by manufacturer specific ULC Assembly and Materials Listing is submitted to the Consultant prior to starting work of this Section.
 - .4 Whole System Compliance: Products installed on site and forming a ULC Listed Assembly must match tested assembly; mixing of different manufacturer's Products from those described in the ULC Listed Assembly will not be permitted unless accompanied by an Engineering Judgement from all manufacturers providing Products to the assembly.

- .2 Sound Transmission Characteristics: Provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by a qualified independent testing agency for STC ratings of specific assemblies indicated on Drawings and as follows:
 - .1 Sound Transmission Characteristics: Sound ratings described on the Drawings and within this Section are based on generic material contributions listed in the Building Code and Gypsum Association GA 600, Fire Resistance Manual or the Building Code Fire and Sound Resistance Tables and Appendices.
 - .2 Provide materials and construction identical to those described in the listed assemblies; or,
 - .3 Provide proof of acoustical performance using alternative proprietary Products showing compliance with fire-resistance ratings and STC-Ratings in accordance with ASTM E90 and Apparent Sound Transmission Class (ASTC-Ratings) in accordance with Building Code, Section 5.8 Sound Transmission.

2.3 Performance requirements

- .1 Gypsum Board Sizes: Provide gypsum boards in maximum lengths and widths available that minimize joints in each area and correspond with support system as indicated on Drawings, with long edges tapered and using thicknesses indicated on Drawings.
- .2 Fire Test Response Characteristics: use materials identical to those listed for ULC assemblies submitted to Consultant for information submittals.
- .3 Mould Resistance: Gypsum Board tested in accordance with ASTM C1396 must have mould resistant facers meeting a rating of 8 or better, showing a maximum of 20% growth based on surface area coverage in accordance with ASTM D3273, except where zero mould growth moisture and mould resistant Products are specified below.

2.4 Materials

- .1 Regular Gypsum Board: Meeting requirements of ASTM C1396M and as follows:
 - .1 Acceptable Products:

- .1 CertainTeed, Regular Gypsum Board
 - .2 CGC, Sheetrock Gypsum boards
 - .3 Georgia-Pacific, ToughRock Gypsum Board
 - .4 Or approved alternate
- .2 Acceptable Alternative Products: Use any of the following lightweight gypsum board products instead of the standard weight products listed above at Contractor's choice:
 - .1 CertainTeed, Easi-Lite Lightweight Gypsum Board
 - .2 CGC, Sheetrock Ultralight Gypsum boards
 - .3 Georgia-Pacific, Lite-Weight Drywall
 - .4 Or approved alternate
- .2 Fire Resistant Gypsum Board: Meeting requirements of ASTM C1396M and having maximum surface burning characteristics of FS-25/SD-5 in accordance with CAN/ULC S102 and as follows:
 - .1 Acceptable Products:
 - .1 CertainTeed, CertainTeed Type-X Gypsum Board
 - .2 CGC, Sheetrock Firecode X
 - .3 Georgia-Pacific, Toughrock Fireguard X
 - .4 Or approved alternate
 - .2 Acceptable Alternative Products: Use any of the following fire-rated products instead of the standard Type-X products listed above at Contractor's choice, provided supporting information is submitted showing acceptable fire-resistance ratings and acoustic performance required for the project:
 - .1 CertainTeed, CertainTeed Type-C Gypsum Board
 - .2 CGC, Sheetrock Firecode C
 - .3 Georgia-Pacific, Toughrock Fireguard C
 - .4 Or approved alternate

2.5 Installation accessories

- .1 Steel Self-Drilling Screws: Self-drilling screws in accordance with ASTM C1002 or ASTM C954 for fastening gypsum boards to steel members based on nominal core metal thickness of framing members, and as follows:
 - .1 Type S: Shallow pitch screw; used for single layer backing board application.
 - .2 Type G: Steep pitch screw; used for double layer backing board application.
- .2 Steel Sheet Backing Plates: Steel sheet for blocking and bracing in length and width indicated on Drawings; 1.2 mm nominal core metal thickness x minimum 400 mm wide in accordance with ASTM C645 requirements for metal and with ASTM A653, Z120, hot dip galvanized zinc coating.
- .3 Joint Tape: To ASTM C475, Type as recommended by gypsum board manufacturer for type of installation; use only mould resistant materials for mould and moisture resistant materials.
- .4 Joint Treatment Materials for Gypsum Board: Provide joint compound and accessory materials in accordance with ASTM C475; for each coat use formulation that is compatible with other compounds applied on previous or for successive coats, and as follows:
 - .1 Pre-Filling: Setting type taping compound.
 - .2 Embedding and First Coat: Drying Type-Compound.
 - .3 Fill Coat: Drying Type-Compound.
 - .4 Finish Coat: Drying type, sandable topping compound.
 - .5 Skim Coat: Drying type, sandable topping compound.
- .5 Joint Compound for Interior Mould and Moisture Resistant Gypsum Board: Provide joint compound and accessory materials in accordance with ASTM C475; for each coat use formulation that is compatible with other compounds applied on previous or for successive coats and as follows:
 - .1 Pre-Filling: Setting type joint compound.
 - .2 Embedding and First Coat: Setting type joint compound.
 - .3 Fill Coat: Setting type, sandable topping compound.

- .6 Isolation Strip at Exterior Walls: Adhesive backed, closed cell vinyl foam strips that allow fastener penetration without foam displacement, 3 mm thick, in width to suit steel stud size.
- .7 Sealant: Refer to Section 07 92 00.

2.6 Trim accessories

- .1 Interior Trim: Galvanized coated steel sheet or rolled zinc meeting the requirements of ASTM C1047, in the following shapes:
 - .1 CB Corner Bead: Standard 0.40 mm nominal thickness, corrosion resistant outside corner reinforcements, angle to suit installation.
 - .2 Reinforced Corner Bead: Heavy duty 0.45 mm nominal thickness, corrosion resistant outside corner reinforcements for use at high exposure corners, angle to suit installation.
 - .3 L Trim: L-shaped trim 0.40 mm nominal thickness to provide a clean finished edge; exposed long flange receives joint compound; use at exposed panel edges, and returns to adjacent materials.
 - .4 LC Edge Bead: U-shaped trim 0.40 mm nominal thickness to provide a clean finished edge; exposed long flange receives joint compound; use at exposed panel edges, and returns to adjacent materials.
 - .5 Expansion Joints: Back-to-back edge beads at joints spanning building expansion and movement joints.
 - .6 Control Joints: V-shaped trim having strippable joint protection specifically manufactured to provide thermal stress relief to large ceiling and wall areas; confirm locations with Consultant before installation.
 - .7 Strippable Edge Trim: Extruded PVC with pre-masked L-shaped tape on trim with tear away protective serrated strip for removal after compound and paint is applied, for use at areas where gypsum butts aluminum frames and where gypsum butts concrete or concrete block.

3 Execution

3.1 Examination

- .1 Verify that partition and ceiling components, substrates and framing, and other conditions affecting installation are satisfactory before starting installation.
 - .1 Proceed with installation only after unsatisfactory conditions are corrected.

3.2 Preparation

- .1 Mould Prevention: Do not install gypsum boards that are wet, that have been damaged by moisture, or that have evidence of mould growth such as fuzzy surfaces or dark splotchy surfaces and discolouration:
 - .1 Keep gypsum board dry throughout installation.
 - .2 Do not install gypsum board over other building materials where conditions exist that are favourable to mould growth.
 - .3 Install gypsum board installed on walls with a minimum 6 mm gap between bottom edge of panel and floor surface.
- .2 Movement Control Joints and Trims: Form control joints to account for thermal movements, to account for movement where direction of framing changes direction, and movements arising differing substrate materials using V-Shaped trims by framing back-to-back framing members and a break in gypsum board at a maximum of 7.5 metres o/c, as follows:
 - .1 Install control joints in wall and ceiling construction in accordance with ASTM C840 so that gross area enclosed by joints does not exceed 80 m² between joints using limiting distances as follows:

Partition Type	Maximum Single Dimension
Interior Partitions	9 metres
Interior Ceilings with Perimeter Relief	15 metres
Interior Ceilings without Perimeter Relief	9 metres

- .2 Lay out control joints to coincide as far as possible with door, window or screen frames, but not necessarily to occur at every individual frame; install control joints vertically from corners of openings.
 - .3 Provide continuous dust barrier behind joints.
 - .4 Install joints straight and true.
 - .5 Form control joints to meet sound rated construction and fire ratings required for remainder of wall or ceiling construction.
 - .6 Obtain Consultant's acceptance of control joint layout before starting installation of materials specified in this Section.
- .3 Gypsum Board Application and Finishing Standards: ASTM C840 and generally at the following locations and as indicated on Drawings:
- .1 Fire Resistant Type: Fire resistance rated assemblies; fire resistant description can modify any of the following gypsum board types.
 - .2 Regular Type: Vertical surfaces not subject to wetting.
 - .3 Sag Resistant Type: Overhead and horizontal surfaces not subject to wetting.
 - .4 Mould and Moisture Resistant Type: Vertical and horizontal surfaces subject to wetting.
 - .5 Impact Resistant Type: As indicated on Drawings.
- .4 Panel Application Methods: Install in accordance with ASTM C840 and manufacturer's written instructions and as follows:
- .1 Single Layer Application:
 - .1 Ceilings: Apply gypsum boards before partition board application to the greatest extent possible and at right angles to framing.
 - .2 Partitions: Apply gypsum boards vertically (parallel to framing), unless horizontal application is indicated or otherwise required by fire resistance rated assembly, and to minimize end joints.
 - .3 Stagger abutting end joints not less than one framing member in alternate courses of board.

- .4 Stairwells and other Tall Partitions: Apply gypsum boards horizontally, unless otherwise required by fire resistance rated assembly.
- .5 Apply gypsum boards using Type S screws fastened 10 mm from edges of board with screws long enough to penetrate 10 mm into metal framing.
- .6 Apply gypsum board to assemblies having resilient channels using Type S screws fastened 38 mm edges of boards; coordinate with installation of resilient channels.
- .2 Double Layer Application:
 - .1 Apply first layer using Type S screws fastened 38 mm from long edges of board and 10 mm from short edges of board.
 - .2 Stagger and offset joints of second layer from first layer and secure as specified for single layer application using Type G screws fastened 10 mm from edges of board with screws long enough to penetrate both layers and penetrate 10 mm into metal framing.
 - .3 Apply gypsum board to assemblies having resilient channels as follows:
 - .1 Base Layer: Using Type S screws fastened 38 mm from long edges of board and 10 mm from short edges of board.
 - .2 Face Layer: Using Type G screws fastened 38 mm from long and short edges of board; offset face layer so that joints do not line up with base layer.
 - .3 Coordinate with installation of resilient channels.
- .5 Install sound attenuation blankets before installing gypsum boards, unless blankets are readily installed after panels have been installed on one side.
- .6 Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling; stagger abutting end joints of adjacent panels not less than one framing member spacing.

- .7 Install gypsum boards with face side out; butt panels together for a light contact at edges and ends with not more than 1.5 mm of open space between panels; do not force into place.
- .8 Locate edge and end joints over supports:
 - .1 Do not place tapered edges against cut edges or ends.
 - .2 Stagger vertical joints on opposite sides of partitions.
 - .3 Do not make joints other than control joints at corners of framed openings.
 - .4 Stop gypsum board away from underside of floor above and roof deck to allow for deflection of structure.
 - .5 Attach gypsum board to vertical studs, not to ceiling track, to allow for deflection.
- .9 Attach gypsum boards to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- .10 Attach gypsum boards to framing provided at openings and cut outs.
- .11 Cover both faces of steel stud partition framing with gypsum boards in concealed spaces (above ceilings, etc.), except in chases braced internally:
 - .1 Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 0.7 m² in area.
 - .2 Fit gypsum boards around ducts, pipes, and conduits.
 - .3 Cut gypsum boards to fit profile formed by coffers, joists, and other structural members where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks; allow 6 mm to 10 mm wide joints to install sealant.
- .12 Isolate perimeter of non-load bearing gypsum board partitions at structural abutments, except floors. Provide 6 mm to 13 mm wide spaces at these locations, and trim edges with J-bead edge trim where edges of gypsum boards are exposed. Seal joints between edges and abutting structural surfaces with acoustic sealant.

- .13 Space fasteners in gypsum boards according to referenced gypsum board application and finishing standard and manufacturer's written recommendations, and as follows:
 - .1 Space screws a maximum of 300 mm o/c for vertical applications.
 - .2 Space fasteners in panels that are tile substrates a maximum of 200 mm o/c.
- .14 Install fire rated and labelled gypsum board at locations indicated on Drawings; continue fire and smoke rated wall construction behind and around fire hose cabinet recesses and other recessed items larger than a double gang switch box to maintain wall fire rating:
 - .1 Place self-adhering labels or apply stencilled and painting assembly identification on applicable wall assemblies.
- .15 Install sheet metal wall backing continuously where reinforcement is required for wall hung accessories and assemblies and as follows:
 - .1 Butt joints between adjoining metal sheets.
 - .2 Form sheet metal extending 150 mm on each side of wall and ceiling corners without joints where metal backing is continuous around corners.
 - .3 Spot glue first gypsum board layer at 150 mm o/c to metal backing to hold in place before mechanically fastening surface layer of gypsum board in a two layer installation.
- .16 Finishing Gypsum Board Assemblies:
 - .1 Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
 - .2 Pre-fill open joints, rounded or bevelled edges, and damaged surface areas.
 - .3 Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
 - .4 Mould Resistant Gypsum Board: Do not tape or fill joints in resistant gypsum board used as a substrate for ceramic tile.

3.3 Installation of acoustic components

- .1 STC Rated Assemblies: Seal construction at perimeters, behind control and expansion joints, and at openings and penetrations with a continuous bead of acoustic sealant. Install acoustic sealant at both faces of partitions at perimeters and through penetrations. In accordance with ASTM C919 and manufacturer's written recommendations for locating edge trim and closing off sound flanking paths around or through gypsum board assemblies, including sealing partitions above acoustic ceilings.
- .2 Acoustic Sealants: Seal sound rated partitions in strict in accordance with gypsum board manufacturer's instructions for the specific sound rating requirements. Provide two (2) beads of sealant where no sealants are indicated; one under each inner and outer layer of gypsum board and as follows:
 - .1 Locate sealant so that it is covered at completion of partition when finishes applied; use appropriate sealant for exposed locations.
 - .2 Seal around mechanical and electrical work and other work in walls to achieve proper sound ratings.
 - .3 Provide gaskets where partitions abut a finished surface or material and where partitions meet exterior wall furring.
 - .4 Build in all door and borrowed light frames and equipment to provide a neat, cleanly finished system.
 - .5 Construct fire rated partitions using firestopping sealant applied subsequent to installation of acoustic sealant beads to maintain required sound ratings and fire performance requirements applied to both sides of partition or penetration.
 - .6 Construct zero hour rated smoke separations similarly as non-fire rated partitions using multiple beads of acoustical sealant materials with a final layer of smoke rated acoustical sealant applied to one side of partition or penetration that replaces one conventional bead of acoustical sealant.
- .3 Acoustic Sound Batts: Install acoustic sound batts within metal stud space and above suspended gypsum board ceilings as indicated for sound or fire rating and as follows:
 - .1 Acoustic sound batts to extend full height of partitions.

- .2 Fill behind electrical outlet boxes, fire hose cabinets, washroom accessories and other openings with at least 150 mm lap around perimeter of opening; do not compress acoustic sound batts as this could cause the gypsum board finish to bulge or push outward.
- .3 Coordinate with Electrical and Mechanical Subcontractors and verify that no back-to-back openings are formed, whether or not so indicated on drawings.
- .4 Installation to in accordance with manufacturer's current written recommendations.

3.4 Installation of trim accessories

- .1 For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- .2 Control Joints: Install control joints at locations indicated on Drawings, confirm locations of joints with Consultant before construction, and in accordance with ASTM C840 and in specific locations approved by Consultant for visual effect where joints are not otherwise indicated.
- .3 Reveals: Cut vertical trims and casing beads at horizontal reveal locations, and install horizontal reveals continuous around corners and edges.

3.5 Closeout activities

- .1 Adjusting and Repairs: Touch-up minor damage to finishes in accordance with manufacturer's instructions; remove and replace gypsum board panels that cannot be successfully cleaned and repaired.

End of section

1 General

1.1 Summary

- .1 This Section includes requirements for supply and installation of the following:
 - .1 Ceramic Floor & Wall Tile
 - .2 Tile setting accessories including edge strips, transition strips, and other accessories required for a complete and finished installation

1.2 Related requirements

- .1 Section 02 41 19 – Selective Demolition: Removal of existing tile.
- .2 Section 06 20 00 – Finish Carpentry and Millwork
- .3 Section 07 92 00 – Joint Sealants: Sealing expansion, contraction, control, and isolation joints in tile surfaces.
- .4 Section 09 06 00 – Schedules for Finishes: Acceptable materials forming the design reference for work of this Section.
- .5 Section 09 28 11 – Backing Boards: Tile backer boards required for tile installation and installed as a part of gypsum board installation.
- .6 Surface or recessed mounted stainless steel washroom and custodial accessories.

1.3 Reference standards

- .1 American National Standards Institute/Ceramic Tile Institute (ANSI/CTI):
 - .1 ANSI A108/A118/A136.1-2017, Specification for the Installation of Ceramic Tile
 - .2 ANSI A137.1-2017, Specification for Ceramic Tile
- .2 American Society for Testing and Materials (ASTM International):
 - .1 ASTM C920-18, Standard Specification for Elastomeric Joint Sealants
 - .2 ASTM C1178/C1178M-18, Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel

- .3 ASTM C1658/C1658M-13, Standard Specification for Glass Mat Gypsum Panels
- .4 ASTM D3273-12e1, Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
- .5 ASTM E84-12c, Standard Test Method for Surface Burning Characteristics of Building Materials
- .3 Canadian Standards Association (CSA Group):
 - .1 CSA A179-14, Mortar and Grout for Unit Masonry, including updates
 - .2 CSA A3000-08, Cementitious Materials Compendium
 - .3 CSA B79-08(R2013), Commercial and Residential Drains and Cleanouts
- .4 International Concrete Repair Institute (ICRI):
 - .1 Technical Guidelines 03732, Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings and Polymer Overlays.
- .5 Terrazzo, Tile and Marble Association of Canada (TTMAC):
 - .1 2016/2017 Specification Guide 09 30 00, Tile Installation Manual
 - .2 Hard Surface Maintenance Guide
- .6 Underwriters Laboratories of Canada (ULC):

1.4 Administrative requirements

- .1 Pre-Construction Meeting: Arrange a preconstruction meeting in accordance with Section 01 31 19 – Project Meetings, to discuss installation techniques, confirm compatibility of materials, identify any concerns arising from site conditions and identify any concerns of the installer or supplier, attended by Contractor, Consultant, tile installer and tile supplier, mortar and grout representative and waterproof and crack control membrane representatives.

- .2 Coordination: Alignment of miscellaneous specialties, fixtures and other components penetrating tiling installation is critical to final appearance of the Project:
 - .1 Coordinate with wall framing installer for appropriate offsets and blocking of framing installation to allow penetrating fixtures to centre align at intersection of tile grout lines.
 - .2 Coordinate with size of components penetrating tiling, and cut and shape tile products to match penetrating components:
 - .1 Site cutting will only be permitted where tiling Subcontractor can demonstrate clean cut lines and retaining remainder of tile body free from cut marks or snap lines.
 - .2 Snapped tiles reassembled around penetrating components will not be for this Project.

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 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 Shop Drawings: Submit shop drawings for the following:
 - .1 Tile patterns and locations.
 - .2 Widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
 - .3 Indicate swim lane lines and other pool markings and special patterns.
 - .4 Indicate locations of inserts and edging details.

- .3 Samples for Initial Selection: Submit samples for initial selection by Consultant:
 - .1 Tile: Manufacturer's colour charts consisting of actual tiles or sections of tiles showing the full range of colours, textures, and patterns available for each type and composition of tile indicated. Include Samples of accessories involving colour selection.
 - .2 Grout: Manufacturer's colour charts consisting of actual sections of grout showing the full range of colours available for each type of grout indicated.
- .4 Samples for Verification: Submit samples for verification including sample sets showing the full range of variations expected where products involve normal colour and texture variations:
 - .1 Submit two (2) pieces of each tile specified.
 - .2 Submit 300 mm x 300 mm sized panel using specified material mounted on 19 mm thick plywood backer.
 - .3 Full size units of each type of trim and accessory for each colour required.
 - .4 Metal edge strips in 150 mm lengths.
- .3 Informational Submittals: Provide the following submittals during the course of the work:
 - .1 Certificates: Submit written statements from manufacturers indicating compatibility with respect to other manufacturer's materials where more than one manufacturer's products form a part of a single tile assembly.

1.6 Project closeout submissions

- .1 Operation and Maintenance Data: Submit copies of TTMAC Maintenance Guide in accordance with Section 01 78 00 – Closeout Submittals and additional materials as follows:
 - .1 Provide 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 accordance with Section 01 78 00 – Closeout Submittals as follows:
 - .1 Deliver minimum 1-4 litre container of cleaning products specified for maintenance cleaning in item 2.6.1.2 below and store as directed by Owner.
 - .2 Deliver tile maintenance materials in the following quantities:
 - .1 Tile: 2% of total installation with a minimum of 1 box of each colour and type.
 - .2 Trim Units: 3% of total installation consisting of full size units of each type, composition, colour, and pattern

1.7 Quality assurance

- .1 Qualifications: Provide proof of qualifications when requested by Consultant:
 - .1 Standard of work for this Section: Provide materials and workmanship in accordance with recommendations of Terrazzo, Tile and Marble Association of Canada (TTMAC) and the material and installation standard contained in the referenced standards.
 - .2 Supplier: Obtain materials from one source with resources to provide products from the same production run for each contiguous area of consistent quality in appearance and physical properties.
 - .3 Materials: Tile that does not meet a Grade 1 Standard, or is marked as a factory second or discount will be rejected, immediately removed from the site and replaced with specified materials.
 - .4 Installers: Execute Work of this Section using qualified personnel skilled in ceramic tile installation, having five (5) years proven experience and have completed tile installations similar in material, design, and extent to that indicated for this Project.

1.8 Delivery, storage, and handling

- .1 Delivery and Acceptance Requirements: Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use in accordance with ANSI A108.1 for labelling sealed tile packages.

- .2 Storage and Handling Requirements: Store materials to prevent damage or contamination to materials by water, freezing, foreign matter, and other causes; store cementitious materials in a dry area, and blocked off floor and ground surfaces.

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.

2 Products

2.1 Materials

- .1 Performance Requirements: Provide tile products manufactured in accordance with ANSI A108.1 or ANSI A137.1 as appropriate to the Acceptable Materials and as follows:
 - .1 Colour Variations: Factory blend tile that exhibits colour variations within the ranges selected; package so tile units taken from one package showing same range in colours as those taken from other packages.
 - .2 Slip Resistance: Provide materials having a minimum Dynamic Coefficient of Friction (DCOF) of 0.42 wet in accordance with ANSI A137.1 when tested using the BOT-3000 Digital Tribometer.

- .3 Load Bearing Performance: Provide installations rated for the following load bearing performance in accordance with ASTM C627 for ceramic tile installed on walkway surfaces:
 - .1 Extra Heavy: Passes cycles 1 through 14.
 - .2 Heavy: Passes cycles 1 through 12.
 - .3 Moderate: Passes cycles 1 through 10.
 - .4 Light: Passes cycles 1 through 6.
 - .5 Residential: Passes cycles 1 through 3.
- .4 Provide Products used in exits having a flame spread rating of 25 or less when tested in accordance with ASTM E84 or ULC S102.2.

2.2 Tile

- .1 Type TL-1: Large Format wall tile, cushioned edge, conforming to referenced standards and the following:
 - .1 Composition: Porcelain
 - .2 Type: Floor tile
 - .3 Class: MR 1
 - .4 Dimensions: As indicated in Section 09 06 00.
 - .5 Appearance: Matte
 - .6 Colour: As indicated in Section 09 06 00.
 - .7 Acceptable Product: As indicated in Section 09 06 00.
- .2 Type TL-2: Large Format wall tile, cushioned edge, conforming to referenced standards and the following:
 - .1 Composition: Porcelain
 - .2 Type: Wall tile
 - .3 Class: MR 1
 - .4 Dimensions: As indicated in Section 09 06 00.
 - .5 Appearance: Matte
 - .6 Colour: As indicated in Section 09 06 00.
 - .7 Acceptable Product: As indicated in Section 09 06 00.

.3 Type TL-3: Large Format floor tile, cushioned edge, conforming to referenced standards and the following:

- .1 Composition: Porcelain
- .2 Type: Wall tile
- .3 Class: MR 1
- .4 Dimensions: As indicated in Section 09 06 00.
- .5 Appearance: Matte
- .6 Colour: As indicated in Section 09 06 00.
- .7 Acceptable Product: As indicated in Section 09 06 00.

2.3 Trims

- .1 Transition Edge Strips: As indicated in Section 09 06 00.

2.4 Accessory materials

- .1 Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers and as follows:
 - .1 Job Site Cleaner: Phosphoric acid/nitric acid based cleaning solution mixed in accordance with cleaner manufacturers recommendations and as recommended by tile manufacturer.
 - .2 Maintenance Cleaner: Non-toxic, electrolytic, biodegradable, non-ammonia containing, pH controlled cleaning solution mixed in accordance with manufacturer's recommendations.
- .2 Backer Board: As indicated in Section 09 28 11 – Backing Boards.

2.5 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 Ardex
 - .2 Custom Building Products Ltd.
 - .3 Flextile Ltd.
 - .4 Kiesel Bauchemie GmbH

- .5 Laticrete International Inc.
 - .6 MAPEI Inc.
 - .7 Parex USA Inc.
 - .8 Or approved alternate
- .2 Primer: Low VOC, low viscosity primer as recommended by manufacturer to suit substrate and site conditions; provide proof of bonding ability of setting system where manufacturer recommends that a primer is not necessary to installation.
- .3 Portland Cement Mortar Levelling Bed: Meeting requirements of CSA A179 containing the following:
 - .1 Cement: Grey meeting requirements of CSA A3000
 - .2 Sand: Meeting manufacturer's requirements
 - .3 Water: Potable
 - .4 Hydrated Lime: Meeting requirements of ASTM C207
- .4 Surface Preparation Materials: Provide manufacturer's recommended primer or bond enhancing surface preparation material and provide the following underlayment materials:
 - .1 Levelling Bed/Mortar Additive: Cementitious Performance standard meeting requirements of ANSI A108.1, Type 2; Materials:
 - .1 Ardex
 - .2 Custom Building Products Level Quik Underlayment
 - .3 Flextile Ltd., Dry Pack Mortar Mix with #43 Additive
 - .4 Kiesel Sercocret RS
 - .5 Laticrete International Inc. 220 Medium Bed Mortar
 - .6 MAPEI Inc. 4 to 1 Mud Bed Mix with Planicrete AC
 - .7 Merkrete Underlay C with 150 Latex Additive
 - .8 Or approved alternate

- .5 Interior Thin Set Wall System: Dry set mortar meeting or exceeding the requirements of ANSI A118.1 formulated for thin set applications, factory sanded mortar consisting of portland cement, sand and additives requiring only potable water to be added for installation complete with bond enhancing latex additive and waterproof crack and isolation membrane as listed in 2.12 below:

- .1 Mortar materials:

- .1 Ardex X 4
 - .2 Custom Building Products Premium Plus
 - .3 Flextile Ltd., #51 Floor and Wall Mix
 - .4 Laticrete International Inc. 317 Thinset Mortar
 - .5 MAPEI Inc. Ultralite S2
 - .6 Kiesel Servolight S2 SuperTec
 - .7 Merekrete 705 Pro Set Polymer Modified Thin Set Mortar
 - .8 Or approved alternate

- .2 Additive materials:

- .1 Custom Building Products Thin-set Mortar Admix
 - .2 Flextile Ltd., #43 Acrylic Additive
 - .3 Kiesel, no additive required
 - .4 Laticrete International Inc. 3701 Acrylic Mortar Admix
 - .5 Merkrete 705, no additive required
 - .6 Or approved alternate

2.6 Grout

- .1 Colours will be selected from manufacturer's full range.
- .2 Portland Cement Grout for Wall and Floor Joints ≤ 3 mm Interior Only (GU): factory blended polymer modified mixture meeting requirements of ANSI A118.6:

- .1 Materials:

- .1 Ardex FG-C Microtec Unsanded Floor and Wall Grout
 - .2 Custom Building Products Polyblend Unsanded Grout
 - .3 Flextile Ltd., 500 Series Unsanded Grout

- .4 Laticrete International Inc. 600 Series Unsanded Grout/1776 Admix
 - .5 MAPEI Inc. Keracolor U Unsanded Grout
 - .6 Merekrete Versatile XF Color grout
 - .7 Or approved alternate
- .3 Urethane Grout: Water cleanable, chemical resistant premixed urethane based sanded grout.
 - .1 Acceptable Products:
 - .1 Flextile Ltd, ColourMax Plus
 - .2 Or approved alternate
- .4 Flexible Grout: Silicone Rubber to ASTM C920, non-solvent curing type; colour selected by Consultant from full range of colours to match other grout materials.

2.7 Mixing mortars and grout

- .1 Mix mortars and grouts in accordance with referenced standards, and mortar and grout manufacturers' written instructions.
- .2 Add materials, water, and additives in accurate proportions.
- .3 Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

3 Execution

3.1 Examination

- .1 Examine materials ordered for the project before delivering to the site; open boxes and confirm that materials match accepted samples, are free from defects and breakage detrimental to final appearance and installation, and as follows:
 - .1 Consultant will only accept Grade 1 Standard, materials appearing on site factory marked as seconds or discounted or that are not consistent with materials submitted for review will be rejected.

- .2 Replace un materials at no additional cost to the Owner; order replacement materials using most expedient delivery method to minimize effect on construction schedule.
- .2 Examine substrates, areas, and conditions where tile will be installed for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile and confirm the following:
 - .1 Verify that substrates for setting tile are firm; dry; clean; free from oil, waxy films, and curing compounds; and are within starting flatness tolerances and are ready for application of levelling materials specified in this Section.
 - .2 Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of Work, and similar items located in or behind tile have been completed before installing tile.
 - .3 Verify that joints and cracks in tile substrates are coordinated with tile joint locations; adjust joints in consultation with Consultant where joints are not coordinated.
 - .4 Verify that concrete substrates have been allowed to cure for a minimum of ninety (90) days in accordance with TTMAC requirements.
 - .5 Verify that tile subject to colour variations has been blended in the factory and packaged so tile units taken from one package show the same range of colours as those taken from other packages. If not factory blended, blend tiles at site before installing.
 - .6 Verify that back of tile is free from contamination before installation.
- .3 Notify Contractor in writing of any conditions that are not ; do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 Preparation

- .1 Surface Preparation:
 - .1 Make backing surfaces level and true to a tolerance in plane of ± 3 mm in 2440 mm 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.
- .4 Painted surfaces must be sanded and scarified to a minimum Concrete Surface Profile 4 in accordance with ICRI Guideline 03732.
- .5 Press wood, particleboard, chipboard, masonite, asbestos board and similar unstable materials will not be considered as suitable substrates to receive tiles.
- .2 Examine concrete substrate, repair as required to produce level, clean surface for new tile installation. Repair Work shall include levelling, filling, grinding or cutting.
- .3 Work of other trades that is required before new tile installation (i.e. electrical conduit installed below ceramic tile) shall be installed, complete and approved before tile installation.
- .4 Examine existing ceramic tile to remain, replace all defective, cracked, loose, broken, delaminated tile to produce a sound substrate.

3.3 Installation

- .1 Install tiling in accordance with requirements of TTMAC Tile Installation Manual and parts of ANSI A108 Series of tile installation standards that apply to types of setting and grouting materials, and to methods required for complete ceramic tile installation.
- .2 Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions:
 - .1 Terminate Work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
 - .2 Cut edges smooth, even and free from chipping.
 - .3 Do not split tile.

- .3 Accurately form intersections and returns; perform cutting and drilling of tile without marring visible surfaces:
 - .1 Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints.
 - .2 Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so that plates, collars, or covers overlap tile.
- .4 Lay tile in pattern indicated on Drawings and as follows:
 - .1 Lay out tile Work and centre tile sites in both directions in each space or on each wall area.
 - .2 Centre tile patterns between control and movement joints. Notify the Consultant for further instructions where tile patterns do not align with control or movement joints.
 - .3 Cut tile accurately and without damage.
 - .4 Smooth exposed cut edges with abrasive stone, where exposed.
 - .5 Chipped or split edges are not .
 - .6 Minimum tile width: $\frac{1}{2}$ unit unless specifically indicated otherwise on Drawings.
 - .7 Adjust tile layout to minimize tile cutting.
 - .8 Provide uniform joint widths.
 - .9 Make joints between tile sheets the same width as joints within tile sheets so joints between sheets are not apparent in finished Work.
 - .10 Cut, drill, and fit tile as required accommodating Work of other trades.
- .5 Press setting material into the back of tile having raised or textured backs to provide a minimum of 95% coverage:
 - .1 Set tile in place while bond coat is wet and tacky before it has skinned over.
 - .2 Notch bond coat in horizontal straight lines and set on freshly set setting material while moving tile back and forth at 90° to the notches.
 - .3 Fully support corners and edges of tile with setting material.
 - .4 Set tile with, maximum lippage of 1 mm over a 3 mm wide joint.

- .6 Prevent rapid drying of setting material:
 - .1 Do not set tile on dry bed.
 - .2 Sound tile after setting and replace any hollow sounding units to obtain full bond.
- .7 Provide additional ventilation as required.
- .8 Clean excess setting materials from surface of tiles before final set.
- .9 Sound tiles after setting material have cured and replace hollow sounding tile before grouting.
- .10 Joint Widths: Install tile with the following joint widths:
 - .1 Wall Tile: 1.5 mm
 - .2 Paver Tile: 3 mm
 - .3 Make joints consistent width and alignment within tile area.
 - .4 Maintain $\frac{2}{3}$ of grout joint depth free of setting material.
- .11 Back Buttering: Obtain minimum 100% mortar coverage in accordance with applicable requirements for back buttering of tile in referenced TTMAC and ANSI A108 series of tile installation standards for the following applications:
 - .1 Tile having tiles 305 mm or larger in any direction
 - .2 Tile having tiles with raised or textured backs
 - .3 Tile having tile installation rated for Heavy or Extra Heavy Duty.
 - .4 All porcelain tiles with more than 20% of the tile backs covered with white firing release shall be back buttered so that 100% of the back is covered with adhesive mortar rated for C627, Extra Heavy Duty rating.
- .12 Install prefabricated edge strips and control joints at locations indicated or where exposed edge of tile meets different materials and exposed substrates.

3.4 Grout

- .1 Install grout in accordance with manufacturer's written instructions, the requirements of the Terrazzo, Tile and Marble Association of Canada (TTMAC), and as follows:
 - .1 Allow proper setting time before application of grout.
 - .2 Force grout into joints to a smooth, dense finish.
 - .3 Remove excess grout in accordance with manufacturer's written instructions and polish tile with clean cloths.
- .2 Install grout for ceramic tile (sand-portland cement, dry-set, commercial portland cement, and latex-portland cement grouts) in accordance with ANSI A108.10.
- .3 Install chemical-resistant epoxy grouts in accordance with ANSI A108.1; clean from tile surfaces as work proceeds in accordance with manufacturer's written instructions using clean water.

3.5 Waterproofing

- .1 Install cementitious backer boards and treat joints in accordance with ANSI A108.11 and manufacturer's written instructions for type of application indicated for the following applications:
 - .1 Shower surrounds including shower niche
- .2 Install waterproofing in accordance with waterproofing manufacturer's written instructions to produce a waterproof membrane of uniform thickness bonded securely to substrate.
- .3 Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.6 Site quality control

- .1 Arrange for mortar and grout manufacturer's representative to review delivered materials and confirm in writing that materials and mixes specified for the project are in accordance with manufacturer's requirements.

3.7 Cleaning and protection

- .1 On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter using Job Site Cleaner listed in 2.4.1.1 above:
 - .1 Remove grout residue from tile as soon as possible.
 - .2 Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's written instructions, but no sooner than ten (10) days after installation.
 - .3 Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning.
 - .4 Flush surface with clean water before and after cleaning.
- .2 Leave finished installation clean and free of cracked, chipped, broken, unbonded, or other tile deficiencies.
 - .1 Provide protective covering until Substantial Performance of the Work.
 - .2 Protect wall tiles and bases from impact, vibration, heavy hammering on adjacent and opposite walls for a minimum of fourteen (14) days after installation.

3.8 Installation schedule

- .1 Install tile on walls on tile backer gypsum panels to TTMAC 304W.

End of section

1 General

1.1 Summary

- .1 This Section includes requirements for installation of tile carpeting.

1.2 Related requirements

- .1 Section 09 05 61 – Common Work Results for Flooring Preparation: Coordination of requirement floor flatness for installation of levelling materials required by this Section.
- .2 Section 09 06 00 – Schedules for Finishes

1.3 Reference standards

- .1 American Association of Textile Chemists and Colorists (AATCC):
 - .1 AATCC 16.1-2014, Colour Fastness to Light: Outdoor
 - .2 AATCC 134-2016, Electric Propensity of Carpets
 - .3 AATCC 165-2013, Colourfastness to Crocking: Carpets – AATCC Crockmeter method
- .2 American Society for Testing and materials (ASTM International):
 - .1 ASTM D1335-17e1, Standard Test Method for Tuft Bind of Pile Yarn Floor Coverings
 - .2 ASTM D2859-16, Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials
 - .3 ASTM E662-17a, Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
 - .4 ASTM F710-17, Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
 - .5 ASTM F1869-16a, Standard Test method for measuring moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
- .3 Underwriters Laboratories Canada (ULC):
 - .1 CAN/ULC S102.2-2018, Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and Assemblies.

1.4 Administrative requirements

- .1 Coordination:
 - .1 Coordinate floor flatness and levelling requirements of this section with requirements of Section 09 05 61 – Common Work Results for Flooring Preparation; work of this Section includes floor levelling and patching required to meet resilient flooring manufacturer's installation requirements; notify Owner where differences occur between specified tolerances and actual conditions.
 - .2 Install carpeting before installing items indicated for installation on top of carpet and after other finishing operations, including painting and ceiling construction, has been completed.

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 manufacturer's standard product data indicating requirements for installation.

1.6 Project closeout submissions

- .1 Maintenance Materials: Provide extra materials that match installed products; packaged with protective covering for storage, and identified with labels describing contents in accordance with requirements of Section 01 78 00 – Closeout Submittals as follows:
 - .1 Tile Carpeting Accessories: 5% of total installation with a minimum length of 3000 mm of each colour and type

1.7 Quality assurance

- .1 Regulatory Requirements: Use only carpeting materials that have been tested and accepted for labelling under ULC S102.2 and meeting requirements of the Authority Having Jurisdiction.

2 Products

2.1 Manufacturers

- .1 Acceptable Products: Acceptable Products are listed in Section 09 06 00 – Schedules for Finishes.
- .2 Substitutions: Owner may consider additional manufacturers having similar products to Acceptable Products Manufacturers listed above during the construction period, provided they meet the performance requirements established by the named products before starting any work of this Section:
 - .1 Do not use substitute materials to establish Bid Price.
 - .2 Substitutions that appear as a part of the project without review and acceptance by the Owner will be rejected, and replaced with one of the specified materials.

2.2 Performance requirements

- .1 Floor Level Tolerances: Make slabs flat measured to a minimum of F_F50 equivalent to ± 3 mm with no more than 2 gaps under 3000 mm straightedge using floor preparation materials specified in Section 09 05 61 – Common Work Results for Flooring Preparation.

2.3 Carpet tile materials

- .1 Tile Carpeting (CPT-1): Product manufacturer and model are indicated in Section 09 06 00.

2.4 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: With toe
 - .4 Height: 100 mm

- .5 Thickness: 3 mm
- .6 Length: 1220 mm
- .7 Acceptable Materials and Colours: As indicated in Section 09 06 00.

2.5 Accessories

- .1 Adhesive and Seam Cement: Self release type, recommended by tile carpeting manufacturer; low odour based, low VOC meeting LEED® requirements.
- .2 Trowellable Levelling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided by or recommended by the Tile Carpeting manufacturer.
- .3 Seaming Cement: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

3 Execution

3.1 Examination

- .1 Examine substrates, areas, and conditions for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance.
- .2 Verification of Conditions (Concrete Substrates): Verify that concrete substrates and conditions are satisfactory for carpet installation and comply with the following specified requirements:
 - .1 Concrete subfloor complies with ASTM F710 and moisture emissions are within manufacturer's recommendations in accordance with ASTM F1869.
 - .2 Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond.
 - .3 Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by the carpet manufacturer.

- .4 Slabs are free of cracks, ridges, depressions, scale, and foreign deposits that could affect the quality of the carpet installation.
- .3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Preparation

- .1 Prepare floors in accordance with Section 09 05 61 – Common Work Results for Flooring Preparation to surface profile required by flooring manufacture.
- .2 Subfloor Treatment: Remove dust, dirt, sealer and wax from existing surfaces; remove ridges and bumps; seal porous and powdery surfaces with concrete floor sealer and apply sub-floor filler to low spots and cracks to achieve level floor to a tolerance of 1:500 in accordance with manufacturer's written requirements.
- .3 Test Layout: Dry lay 10 m² area of tile carpeting with required seam and nap direction and obtain acceptance from Owner before commencing with installation.

3.3 Installation

- .1 Install in accordance with manufacturer's printed instructions using material from same dye lot; mix materials to obtain consistent colour, pattern and texture match within any one visual area.
- .2 Layout tile carpeting as with joints parallel to building lines or as indicated on Drawings to produce a symmetrical tile pattern so that perimeter tile width is minimum ½ full size and as follows:
 - .1 Room Orientation: Quarter Turn
- .3 Fit neatly around architectural, mechanical, electrical and telephone outlets, and furniture fitments, around perimeter of rooms into recesses and around projections:
 - .1 Cut tile carpeting to fit accurately around perimeter of rooms into all recesses and around fixtures.
 - .2 Make cut outs for floor mounted service boxes, receptacles, switches, hardware where they occur on tile carpeting.

- .3 Cut holes as close as possible to allow services to pass through and that trim will completely hide hole when installed.
- .4 Cooperate and coordinate with electrical trade to ensure correct location of outlets is obtained.
- .4 Install edging strips at all openings or doorways and where tile carpeting abuts other floor covering.

3.4 Closeout activities

- .1 Adjusting:
 - .1 Repairs: Replace damaged or defective tile carpeting at no cost to the Owner.
- .2 Cleaning:
 - .1 Remove tile carpeting waste and debris from premises and leave installation clean after completion of carpeting operations in an area.

3.5 Protection

- .1 Protect finished areas from work following installation in accordance with manufacturer's written instructions.

End of section

1 General

1.1 Section Includes

- .1 Surface preparation.
- .2 Painting.

1.2 Related Requirements

- .1 Section 01 31 19 - Project meetings.

1.3 Reference Standards

- .1 MPI (Master Painters Institute) – Architectural Painting Specifications Manual and Maintenance Repainting Manual.

1.4 Administrative Requirements

- .1 Coordination: Coordinate with other Work having a direct bearing on Work of this section.
- .2 Scheduling:
 - .1 Schedule painting operations to prevent disruption of and by other trades.
 - .2 Schedule painting operations to prevent disruption of occupants in and about building.

1.5 Submittals for Review

- .1 Section 01 33 00: Submission procedures.
- .2 Samples:
 - .1 Submit two (2) samples, 8 1/2-inch x 11 inch in size illustrating selected colours and textures for each colour selected.

1.6 Closeout Submittals

- .1 Section 01 78 00: Submission procedures.
- .2 Record Documentation: Upon completion, provide itemized list of products used including the following:
 - .1 Manufacturer's name.

- .2 Product name, type and use.
- .3 Colour coding number.

1.7 Regulatory Requirements

- .1 Conform to applicable code for flame and smoke rating requirements for finishes, storage, mixing, application and disposal of paint and related waste materials.

1.8 Delivery, Storage, and Protection

- .1 Deliver products to site in sealed and labeled containers showing manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, colour designation, and written instructions for mixing and reducing.
- .2 Store paint materials at minimum ambient temperature of 7 °C and a maximum of 32 °C, in dry, ventilated area and as required by manufacturer's written instructions.
- .3 Provide adequate fireproof storage lockers and warnings as required by authorities having jurisdiction for storing toxic and volatile/explosive/flammable materials.

1.9 Site Conditions

- .1 Ambient Conditions:
 - .1 Do not perform painting or decorating Work when ambient air and substrate temperatures are below 10 °C for both interior and exterior work, or as required by paint product manufacturer.
 - .2 Do not perform painting or decorating Work when relative humidity is above 85% or when dew point is less than 3 °C variance between the air/surface temperature required by paint Product manufacturer.
 - .3 Provide suitable weatherproof covering and sufficient heating facilities to maintain minimum ambient air and substrate temperatures for twenty-four (24) hours before, during and after paint application.

- .4 Do not perform painting and decorating Work when maximum moisture content of substrate exceeds:
 - .1 Wood: 15%.
 - .2 Plaster and Gypsum Wallboard: 12 %.
- .5 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple cover patch test.
- .6 Provide minimum lighting level of 30 ft candle is provided on surfaces to be painted or decorated.

1.10 Waste Management and Disposal

- .1 Dispose of waste materials in accordance with local authorities having jurisdiction.
- .2 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
- .3 Place non-reusable materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
- .4 To reduce contaminants entering waterways, sanitary/storm drain systems or into the ground, adhere to the following procedures:
 - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out. In no case shall equipment be cleaned using free draining water.
 - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
 - .3 Return solvent and oil-soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
 - .4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
 - .5 Dry out empty paint cans prior to disposal or recycling.

- .6 Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.
- .5 Set aside and protect surplus and uncontaminated finish materials and deliver or arrange collection for verifiable re-use or re-manufacturing.

2 Products

2.1 Materials

- .1 Use only materials primers, paints, listed in the latest edition of the MPI Approved Product List (APL) on this project.
- .2 Ancillary materials such as linseed oil, shellac, thinners, solvents to be of highest quality product and provided by an MPI listed manufacturer, and compatible with paint materials being used.
- .3 Where possible, all materials to be lead- and mercury-free with low VOC content.
- .4 Provide all material for each system from a single manufacturer.
- .5 Patching Materials: Latex filler.
- .6 Fastener Head Cover Materials: Latex filler.

2.2 Mixing and Tinting

- .1 Coatings: Ready-mixed and pre-tinted; re-mix all paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.
- .2 Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.
 - .1 Do not exceed paint manufacturer's recommendations for addition of thinner. Do not use kerosene or any such organic solvents to thin water-based paints.
 - .2 Thin paint for spraying in accordance with paint manufacturer's instructions.

2.3 Finish and Colour

- .1 Finish: Premium Grade finish requirements.
- .2 Colours and Finishes: Refer to Finish Schedule on Drawings.
 - .1 Interior Colours: Based on one (1) base colours and five (5) accent colours. No more than six (6) colours will be selected for entire project.

2.4 Gloss/sheen Ratings

- .1 Paint gloss is defined as the sheen rating of applied paint with the following values:

Gloss Level	Description	Gloss @ 60°	Sheen @ 85°
G1	Matte Finish (flat)	0 to 5	10 max.
G2	Velvet-Like Finish	0 to 10	10 to 35
G3	Eggshell Finish	10 to 25	10 to 35
G4	Satin-Like Finish	20 to 35	35 min.
G5	Traditional Semi-Gloss Finish	35 to 70	
G6	Traditional Gloss	70 to 85	
G7	High Gloss Finish	More than 85	

- .2 Gloss level ratings of painted surfaces as specified.

2.5 Manufacturers

- .1 Acceptable Paint Manufacturers:
 - .1 Benjamin Moore.
 - .2 ICI.
 - .3 Sherwin Williams.
 - .4 Glidden.
 - .5 or approved alternate.

2.6 Interior Paint Systems

- .1 Paint interior surfaces in accordance with the MPI Manual painting systems listed in this section.
- .2 Galvanized Metal (doors, frames, railings, misc. steel, pipes, overhead decking, ducts, etcetera):
 - .1 INT 5.3J: Waterborne Primer / Latex G5 finish.
- .3 Plaster and Gypsum Board (gypsum board, drywall, and other sheet gypsum materials):
 - .1 INT 9.2A: Latex (over latex sealer) G3 finish.

3 Execution

3.1 Examination

- .1 Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- .2 Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- .3 Test shop applied primer for compatibility with subsequent cover materials.
 - .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
 - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.
 - .3 Apply paint when previous coat of paint is dry or adequately cured.

3.2 Preparation

- .1 Prepare surfaces in accordance with MPI requirements.
- .2 Remove and store miscellaneous hardware and surface fittings such as electrical plates, hardware, light fixture trim, escutcheons, and fittings prior

to painting. Clean and replace upon completion of painting Work in each area.

- .3 Protect adjacent surfaces and areas, including rating and instruction labels on doors, frames, equipment, piping, from painting operations with drop cloths, shields, masking, templates, or other suitable protective means.
- .4 Correct defects and clean surfaces which affect work of this section. Start of finish painting of defective surfaces indicates acceptance of substrate and making good defects will be at no cost to Owner.
- .5 Confirm preparation and primer used with fabricator of steel items.
- .6 Seal with shellac and seal marks which may bleed through surface finishes.
- .7 Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- .8 Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by power tool, hand wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.

3.3 Application

- .1 Apply paint or stain in accordance with MPI Painting Manual Premium Grade finish requirements.
- .2 Apply products to adequately prepared surfaces, within moisture limits and acceptable environmental conditions.
- .3 Apply paint finish in areas where dust is no longer being generated or when wind or ventilation conditions will not affect quality of finished surface.
- .4 Apply each coat to uniform finish.
- .5 Tint each coat of paint progressively lighter to enable confirmation of number of coats.
- .6 Unless otherwise approved, apply a minimum of four (4) coats of paint where deep or bright colours are used to achieve satisfactory results.

- .7 Sand and dust between each coat to provide an anchor for next coat and to remove defects visible from a distance up to 39 inches.
- .8 Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.
- .9 Allow applied coat to dry before next coat is applied.

3.4 Cleaning

- .1 Collect waste material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

End of Section

1 General

1.1 Summary

- .1 This Section includes requirements for supply and installation of enhanced privacy toilet compartments and accessories required for complete and functioning installation.

1.2 Related requirements

- .1 Section 05 50 00 – Metal Fabrications
- .2 Section 06 10 53 – Miscellaneous Rough Carpentry: Wood blocking
- .3 Section 09 29 13 – Gypsum Boards
- .4 Section 09 30 00 – Tiling
- .5 Section 10 28 13 – Toilet Accessories

1.3 Reference standards

- .1 American National Standards Institute (ANSI):
 - .1 ANSI/NEMA LD3.1-2005, Performance, Application, Fabrication, and Installation of High Pressure Decorative Laminates
- .2 American Society for Testing and Materials (ASTM International)
 - .1 ASTM A653/A653M-18, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process
- .3 Canadian Standards Association (CSA Group)
 - .1 CAN/CSA B651-18, Accessible Design for Built Environment
 - .2 CAN3 A172-M79 (R1996), High Pressure, Paper Base, Decorative Laminates

1.4 Administration requirements

- .1 Coordination: Coordinate site dimensions affecting work of other Sections and provide data, dimensions and components, anchors and assemblies installed by other Sections in sufficient time for installation of products specified in this Section.

1.5 Submittals

- .1 Provide required information in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Action Submittals: Provide following submittals before starting work of this section
 - .1 Product Data: Submit product data from manufacturer indicating proposed components and installation requirements.
 - .2 Shop Drawings: Submit shop drawings indicating anchoring and construction details, hardware, finish, relevant dimensions, plan layout and elevations. Refer to CAN/CSA-B651 standard for mounting of barrier free stall grab bars, handles and toilet paper dispensers.
 - .3 Samples for Verification: Provide samples for verification for each product selected.

1.6 Project closeout submissions

- .1 Operation and Maintenance Data: Submit copies of manufacturer's written maintenance information for inclusion in the operations manual in accordance with Section 01 78 00 – Closeout Submittals; provide specific warning of any maintenance practice or materials that may damage or disfigure the finished Work.

1.7 Delivery, storage, and handling

- .1 Delivery and Acceptance Requirements: Deliver, handle and store prefabricated units in accordance with manufacturer's directions.
- .2 Storage and Handling Requirements
 - .1 Store units at site on raised wood pallets protected from elements and corrosive materials, and as follows
 - .1 Do not remove from crates or other protective covering until ready for installation.

1.8 Site conditions

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

2 Products

2.1 Materials

- .1 Partition Type: Floor anchored solid phenolic toilet partitions, minimum 2130 mm high.
- .2 Doors, Panels, and Pilasters: Solid phenolic core panel material with melamine facing on both sides fused to substrate during panel manufacture (not separately laminated), and with eased and polished edges; minimum 19 mm thick doors and pilasters and minimum 13 mm thick wall panels.
- .3 Urinal Screens: Solid phenolic core panel material with melamine facing on both sides fused to substrate during panel manufacture (not separately laminated), and with eased and polished edges; minimum 13 mm thick wall panels.
- .4 Pilaster support: Adjustable bolts with stainless steel collar to ASTM A167.
- .5 Pilaster Shoes: Minimum 100 mm high; 22-gauge (0.8mm) Stainless steel with satin finish.
- .6 Anchor Hardware: Wall and panel brackets, chrome plated non-ferrous die cast zinc alloy or clear anodized aluminum castings and extrusions or heavy gauge stainless steel with satin finish.
- .7 Headrail: Overhead-Braced extruded anodized aluminum. Enclosed construction with sloping top. Face with raised grip-resistant edge.

- .8 Door and Mounting Hardware: Provide door keepers, coat hooks, and mounting brackets: Type-304, heavy-gauge stainless steel with satin finish.
- .9 Occupancy Indicator Latch: Indicator latch with emergency access feature.
- .10 Hinges: Four (4) Barrel-type hinges with adjustable cam for fully closed or partially open.
- .11 Continuous Panel Bracket: One-piece, full-height U-channel and 1.2 mm thick angle bracket.
- .12 Exposed Fasteners: Cadmium plated steel, vandal resistant type.
- .13 Concealed Fasteners: Steel, hot dipped galvanized.

2.2 Accessories

- .1 Provide accessories as required for complete installation.

2.3 Fabrication

- .1 Fabricate standard access stall doors minimum 610 mm wide inward swinging and barrier-free access stall doors minimum 815 mm wide outward swinging with stall widths to minimum dimensions indicated on Drawings and in accordance with CAN/CSA B651.
- .2 Provide internal reinforcement for accessory attachment.

2.4 Finishes

- .1 Match colour requirements listed in Section 09 06 00 – Schedules for Finishes.

3 Execution

3.1 Examination

- .1 Examine site conditions where Work will be applied and ensure acceptability for complete and satisfactory installation; beginning of installation will denote acceptance of site conditions.

3.2 Installation

- .1 Install partitions secure, plumb and square.
- .2 Leave 13 mm space between wall and panel or end pilaster.

- .3 Anchor mounting brackets to masonry/concrete surfaces using screws and shields: to hollow walls using bolts and toggle type anchors, to steel supports with bolts in threaded holes.
- .4 Attach panel and pilaster to “U” channel mounting brackets with through type sleeve bolt and nut.
- .5 Provide for adjustment of floor variations with screw jack through steel saddles made integral with pilaster. Conceal floor fixings with pilaster shoes.
- .6 Equip each door with hinges, latch set, and coat hooks, and as follows:
 - .1 Mount coat hook on door
 - .2 Provide 1 coat hook at 1650 mm for standard stalls.
 - .3 Provide 1 additional coat hook (2 total) at 1250 mm from floor on barrier-free stall.
 - .4 Adjust and align hardware for easy, proper function.
 - .5 Install door bumper mounting.
 - .6 Set standard doors open position at 30° to front.
 - .7 Set barrier-free door open position with maximum 50 mm ajar between door and jamb.
- .7 Full length door stop fit over edge of door.
- .8 Mount door pulls on out swinging doors on inside and outside of door in accordance with CAN/CSA B651.
- .9 Install occupancy indicators in accordance with manufacturer's instructions.
- .10 Install hardware and grab bars specified in Section 10 28 13 – Toilet Accessories and in accordance with CAN/CSA B651.

3.3 Floor supported, overhead braced partition erection

- .1 Attach pilasters to floor with pilaster supports and level, plumb, and tighten installation with levelling device.
- .2 Secure pilaster shoes in position.
- .3 Secure head rail to pilaster face with not less than two fasteners for each face.
- .4 Set tops of doors parallel with overhead brace when doors are in closed position.

3.4 Closeout activities

- .1 Cleaning
 - .1 At completion and continuously as Work proceeds, remove all surplus materials, debris and scrap.
 - .2 At completion of Work, remove all protective surface covering film and wrappings.
 - .3 Clean all panel surfaces using mild soap or other cleaning agent approved by manufacturer.

End of section

1 General

1.1 Summary

- .1 This Section includes requirements for supply and installation of toilet accessories.

1.2 Related requirements

- .1 Section 06 10 53 – Miscellaneous Rough Carpentry: Wood blocking
- .2 Section 08 83 13 – Mirrored Glass Glazing
- .3 Section 09 29 13 – Gypsum Boards
- .4 Section 09 30 00 – Tiling: Ceramic toilet and bath accessories.

1.3 Reference standards

- .1 American Society for Testing and Materials (ASTM International):
 - .1 ASTM A666-15, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
 - .2 ASTM A653/A653M-18, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process
- .2 Canadian General Standards Board (CGSB):
 - .1 CAN/CGSB-12.5-M86, Mirrors, Silvered
- .3 Canadian Standards Association (CSA Group):
 - .1 CAN/CSA B651-18, Accessible Design for Built Environment

1.4 Administrative requirements

- .1 Coordination: Coordinate accessory locations with other affected work to prevent interference with clearances required for access by disabled persons, proper installation within substrate, blocking requirements, adjustment, operation, cleaning, and servicing of accessories including following:
 - .1 Installation of grab bars to metal toilet partitions, provide templates and detail to partition manufacturer for shop fabrication of steel reinforcing plates. Instruct whether shop or site, drill and tap technique will be used.

- .2 Reinforcement locations indicated in Figure 2 attached to this section with Section 09 29 13.
- .3 Delivery of inserts and anchoring devices set into concrete or masonry as required to prevent delay to work of this Section.
- .2 Product Substitutions: Toilet accessory requirements, including those for materials, finishes, dimensions, capacities, and performance, are established by specific Basis-of-Design Materials listed in this section; do not modify aesthetic effects as judged solely by Consultant; submit comprehensive explanatory data to Owner for review where modifications are proposed.

1.5 Submittals

- .1 Provide required information in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Action Submittals: Provide following submittals before starting work of this section:
 - .1 Submit product data including construction details, material descriptions and thicknesses, dimensions, profiles, fastening and mounting methods, specified options, and finishes for each type of accessory specified.
- .3 Information Submittals: Provide following submittals during course of work of this Section:
 - .1 Submit samples for each accessory item to verify design, operation, and finish requirements; accepted full size samples will be returned and maybe used in Work.
 - .2 Submit setting drawings for cut outs required in other work; include templates, substrate preparation instructions, and directions for preparing cut outs and installing anchoring devices.
 - .3 Submit product schedule indicating types, quantities, sizes, and installation locations by room of each accessory required; use designations indicated in Washroom and Custodial Accessory Schedule below and room designations indicated on Drawings in product schedule.

1.6 Project closeout submissions

- .1 Operation and Maintenance Data: Submit copies of manufacturer's written maintenance information for inclusion in the operations manual in accordance with Section 01 78 00 – Closeout Submittals; provide specific warning of any maintenance practice or materials that may damage or disfigure the finished Work.

1.7 Delivery, storage and handling

- .1 Delivery and Handling Requirements: Deliver washroom accessories in manufacturer's original, undamaged packaging, clearly marked for contents and location within building.

1.8 Warranty

- .1 Manufacturer's Mirror Warranty: Submit manufacturer's standard written warranty, executed by mirror manufacturer agreeing to replace mirrors that develop visible silver spoilage defects and as follows:
 - .1 Minimum Warranty Period: 15 years from date of Substantial Performance for Project.

2 Products

2.1 Manufacturers

- .1 Basis-of-Design Products: Products named in this Section were used as basis-of-design for project; manufacturers listed as additional acceptable materials and that offer similar products may be incorporated into work of this Section provided they meet performance requirements established by named products.
- .2 Additional Acceptable Manufacturers: Subject to compliance with performance requirements specified in this Section; as established by the Basis-of-Design Products, use any of the listed manufacturers' products; following manufacturer's do not require submission of a request for substitutions provided required shop drawing and product data submissions are submitted before starting any work of Section.
- .3 Toilet compartments (TP1):
 - .1 ASI American Specialties Inc.
 - .2 Bobrick Washroom Equipment of Canada Ltd.

- .3 Bradley Corporation
- .4 Excel Dryer Inc.
- .5 Frost Ltd.
- .6 Or approved alternate.
- .4 Substitutions: Owner may consider additional manufacturers having similar products to Acceptable Products Manufacturers listed above during the construction period, provided they meet the performance requirements established by the named products and provided they submit requests for substitution in accordance with Section 01 61 00 – Common Product Requirements before starting any work of this Section:
 - .1 Do not use substitute materials to establish Bid Price.
 - .2 Substitutions that appear as a part of the project without review and acceptance by the Owner will be rejected and replaced with one of the specified materials.

2.2 Description

- .1 Regulatory Requirements: Install toilet accessories in accordance with CAN/CSA B651 at accessible washroom locations.

2.3 Performance requirements

- .1 Fastener and Mounting Requirements: Install grab bars to withstand minimum 1.3 kN downward shear force when tested in accordance with ASTM F446; provide fasteners and mountings of types suitable for substrates, and as required for permanent and durable installation.
- .2 Labels: Provide unobtrusive stamped manufacturer logo on exposed surfaces; with printed, waterproof label or stamped nameplate indicating manufacturer's name and product model number mounted to non-exposed faces.
- .3 Surface Mounted Units: Provide units having tight seams and joints, and with exposed edges rolled; doors and access panels having continuous stainless steel hinges; and concealed anchorage where possible.
- .4 Recessed Mounted Units: Provide units having welded construction, without mitred corners; doors and access panels having full length, stainless steel hinges and anchorage fully concealed when unit is closed.
- .5 Framed Glass Mirror Units: Provide frames for glass mirror units designed to protect glass edges from damage, and as follows:

- .1 Mirror Backing: Backing and support system that permits rigid, tamper resistant glass installation and prevents moisture accumulation consisting of minimum nominal 0.8 mm galvanized steel sheet same size as full mirror size with non-absorptive filler material; corrugated cardboard is not an acceptable filler material.
- .2 Mirror Unit Hangers: Provide rigid, tamper and theft resistant, heavy duty wall hanging device consisting of one-piece galvanized steel and spring action locking mechanism to hold mirror unit in position with no exposed screws or bolts.

2.4 Materials

- .1 Sheet Steel: Steel: Cold rolled, commercial quality, stretcher levelled steel sheet in accordance with ASTM A366; minimum nominal thickness as established by product type and manufacturers standard; surface preparation and metal pretreatment as required for applied finish.
- .2 Galvanized Steel Sheet: Minimum Z180 coating designation, cold rolled commercial quality, stretcher levelled galvanized steel sheet in accordance with ASTM A653/A653M; minimum nominal thickness as established by product type and manufacturers standard.
- .3 Mirror Glass: In accordance with CGSB 12.5; Type 1B for high humidity use, 6 mm nominal thickness, with silvering, electroplated copper coating, and protective organic coating.
- .4 Fasteners: Manufacturer's standard for installation; through bolts for mounting to toilet partitions; expansion anchors of type designed to accept anticipated loads and as follows:
 - .1 Galvanized Steel Mounting Devices: In accordance with ASTM A153/A153M, hot dip galvanized after fabrication.
 - .2 Screws, Bolts, and other Devices: Same material as accessory unit, tamper and theft resistant when exposed, and galvanized steel when concealed.
- .5 Keys: Provide universal keys for internal access to accessories for servicing and re-supplying. Provide minimum of six (6) keys to Owner's representative.

3 Execution

3.1 Examination

- .1 Examine site conditions and verify that following are complete:
 - .1 Wall thickness and construction will accept recessed accessories.
 - .2 Solid blocking for support and anchoring of washroom accessories is installed where required.
 - .3 Frames and anchors provided are correctly and securely installed ready to accept accessory scheduled for specific location.
 - .4 Painting is complete and dry in area of installation before accessories are installed.
- .2 Beginning of installation will denote acceptance of site conditions

3.2 Installation

- .1 Install accessories in accordance with manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer; install toilet accessory units level, plumb, and firmly anchored in locations and at heights indicated.
- .2 Conform to mounting heights indicated on Fixture Mounting Schedule attached to this Section and meeting accessibility requirements listed in CAN/CSA B651; confirm locations prior to site installation.
- .3 Secure mirrors to walls using concealed, tamper resistant hangers, toggle bolts, or screws; set mirrors level, plumb, and square at locations indicated, centred over lavatory.
- .4 Install and secure fixtures rigidly in place using tamper proof headed screws and bolts for fasteners and as follows:
 - .1 Stud Walls: Install steel back plate to stud prior to gypsum board finish; provide threaded studs or plugs in back plates
 - .2 Toilet and Shower Compartment Partitions: Install items using male/female through bolts.

3.3 Closeout activities

- .1 Adjusting: Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items.

- .2 Cleaning:
 - .1 Remove temporary labels and protective coatings.
 - .2 Clean and polish exposed surfaces in accordance with manufacturer's written recommendations.
- .3 Demonstration and Training: Instruct Owner in proper adjustment, operation and refilling procedures.

3.4 Maintenance

- .1 Inventory:
 - .1 Provide list of paper towel, toilet paper and other disposable supplies required to make accessories usable.

3.5 Washroom and custodial accessory schedule

No.	Description/Model
CH1	Coat Hooks: Satin finished stainless steel, square profiled double robe hook with concealed mounting, provide as located on drawings, as directed by Owner and as follows: Acceptable Materials: ASI 7345-S Bobrick B-76727 Bradley 9124 Or approved equivalent
GB1	L-Shaped Grab Bars: Standard Duty, nominal 760 x 760 mm L-shape, 32 mm Ø satin finished type 304 stainless steel tube having nominal 1.2 mm wall thickness and slip resistant grip, concealed mounting plate and anchors with stainless steel cap secured using vandal resistant set screws; and as follows: Basis of Design Product: Bobrick, B-5898 Or approved equivalent

No.	Description/Model						
GB2 GB3	Straight Grab Bars: Standard duty 32 mm Ø satin finished type 304 stainless steel tube having nominal 1.2 mm wall thickness and slip resistant grip, concealed mounting plate and anchors with stainless steel cap secured using vandal resistant set screws, length as indicated on drawings: Acceptable Materials: <table> <tr> <td>ASI</td><td>3100 Series</td></tr> <tr> <td>Bobrick</td><td>5806 Series</td></tr> <tr> <td>Bradley</td><td>832 Series</td></tr> </table> Or approved equivalent	ASI	3100 Series	Bobrick	5806 Series	Bradley	832 Series
ASI	3100 Series						
Bobrick	5806 Series						
Bradley	832 Series						
M1	Mirror: Framed, full length, in dimensions and mounted to dimension as shown on drawings to bottom of frame and as follows: Acceptable system backup: Z clip mounting <table> <tr> <td>.1</td><td>Extruded aluminum Z clips complete with isolation tape for separating dissimilar metals from direct contact.</td></tr> <tr> <td>.2</td><td>Z Clip System by Monarch Metal Fabrication</td></tr> <tr> <td>.3</td><td>Or approved equivalent</td></tr> </table>	.1	Extruded aluminum Z clips complete with isolation tape for separating dissimilar metals from direct contact.	.2	Z Clip System by Monarch Metal Fabrication	.3	Or approved equivalent
.1	Extruded aluminum Z clips complete with isolation tape for separating dissimilar metals from direct contact.						
.2	Z Clip System by Monarch Metal Fabrication						
.3	Or approved equivalent						
ND	Feminine Napkin Disposal: Surface mounted, concealed fastening, self closing disposal opening with leak proof plastic receptacle and 10 disposable liners for initial stocking purposes for each unit and as follows: Note: Owner Supplied and Installed.						
PD1	Paper Towel Dispenser: Universal roll towel dispenser, automatic touchless operation, surface mounted, fully adjustable for towel length and time delay; powered using D-Cell Batteries; high impact translucent plastic shell construction and as follows: Acceptable Materials: <table> <tr> <td>Kimberly-Clark</td><td>H-7883SM</td></tr> </table> Or approved equivalent	Kimberly-Clark	H-7883SM				
Kimberly-Clark	H-7883SM						

No.	Description/Model						
SH1	Shelf: Nominal 125 mm wide x 410 mm long, stainless steel shelf, complete with hemmed return edge mounting brackets and as follows: Acceptable Materials: <table><tr><td>ASI</td><td>0692-516</td></tr><tr><td>Bobrick</td><td>B-295-16</td></tr><tr><td>Bradley</td><td>755-16</td></tr></table> Or approved equivalent	ASI	0692-516	Bobrick	B-295-16	Bradley	755-16
ASI	0692-516						
Bobrick	B-295-16						
Bradley	755-16						
SP1	Soap Dispenser: vertical mounting, touch-free, surface mounted dispenser, refillable from top with keyed lock cap, 1.18 L capacity with visible viewing window, powered using C-Cell Batteries and as follows: Acceptable Materials: <table><tr><td>Purell</td><td>ES6 6434-01 Graphite</td></tr></table> Or approved equivalent	Purell	ES6 6434-01 Graphite				
Purell	ES6 6434-01 Graphite						
TD1	Toilet Paper Dispenser: Double roll, surface mounted, tissue dispenser with concealed mounting, with theft resistant spindles and as follows: Acceptable Materials: <table><tr><td>Cascades Pro</td><td>DB12</td></tr></table> Or approved equivalent	Cascades Pro	DB12				
Cascades Pro	DB12						

- .1 Standard equipment mounting heights and wall blocking requirements as shown on drawings.

End of section

1 General

1.1 Summary

- .1 It is the responsibility of Contractor to make requirements for affected related specification sections, and any requirements for alternates and substitutions available to Subcontractors:
 - .1 Subcontractors receive a complete set of Documents for preparation of their Bids, and to provide a clear understanding of the complete scope-of-work for the Project.
 - .2 Failure to provide required information to Subcontractors during the Bid and Construction Phases of the Work will not relieve the Contractor of their responsibility for coordination of the affected Work.
 - .3 Contractor is responsible for any additional costs to the Contract arising from Subcontractors not receiving a complete package of Documents.
 - .4 Provide complete coordination between Mechanical Divisions to attain a complete and functional building mechanical system; Mechanical Divisions include, but are not limited to, the following:
 - .1 Division 20 – Mechanical General Provisions
 - .2 Division 22 – Plumbing
- .2 Provide complete, fully tested and operational mechanical systems to meet requirements described herein and in complete accord with applicable codes and ordinances:
 - .1 Include costs to obtain permits and to pay for fees and charges, including inspection charges by Authorities Having Jurisdiction that issue permits; coordinate related inspections; permits, fees and inspections include, but are not limited to, the following:
 - .1 Plumbing
 - .2 Electrical
 - .3 CSA Requirements
- .3 Documents for the Project, including Specifications and Drawings, are generally diagrammatic and approximately to scale unless specifically

detailed otherwise; they establish scope, material and installation quality, and are not considered as detailed installation instructions.

1.2 Related Requirements

- .1 Section 02 41 19 – Selective Interiors Demolition

1.3 Administrative requirements

- .1 Coordination: Cooperate and coordinate with other trades and verify order of installation of overlapping or interconnecting services or equipment before starting Work.
- .1 Drawings and Specifications: Drawings and specifications are complementary to each other, and what is called for by one is binding as if called for by both and as follows:
 - .1 Examine Contract Documents including drawings and specifications, and work of other trades before starting Work and verify that Work can be satisfactorily completed without changes to building.
 - .2 Owner will provide a clarification to identified discrepancies between drawings and specifications that leave Contractor in doubt as to the true intent and meaning of the documents as follows:
 - .1 During Bid Period: A written Addendum will be issued to address a written request for clarification.
 - .2 During Construction: A Construction Communication will be issued to address a written request for information.
- .2 Owner will respond to Requests for Interpretation and determine the requirements for clarification based only on variances contained in the documents as follows:
 - .1 Clarification based on information and not contained in the documents or in manufacturers written literature will be regarded as a change to the Work.
 - .2 Clarification will be based on the hierarchy of the complete document package, not just the documents provided to Subcontractor by Contractor.

- .3 Clarification will include effects or influence of other specified products, adjacent construction, adjacent finishes and methods of construction.
- .4 Clarification issued during Construction Phase that affects the cost of the Work will be regarded as a Change to the Work.
- .3 Coordinate installation of the Work with manufacturer's recommended installation details and procedures, supplemented by requirements of Contract Documents; provide adequate access space for maintenance and service of equipment and systems.
- .4 Coordinate installation of Work with adjacent work by others in accordance with requirements listed in Section 01 73 00 – Execution and as follows:
 - .1 Install material and equipment generally in locations and routes shown, close to building structure with minimum interference with other services or free space; remove and replace improperly installed equipment as determined by Owner.
 - .2 Refer to electrical, mechanical, structural and architectural drawings when setting out work and coordinate with other applicable components of the Work when setting out locations for ductwork, equipment, and piping so that conflicts are avoided and symmetrical even spacing is maintained.
 - .3 Provide coordination drawings showing the work of other trades and contractors involved in areas of potential conflict or congestion at no additional cost to the Contract.
 - .4 Coordinate dimensional details with applicable architectural and structural drawings.
 - .5 Full size and detailed drawings will take precedence over scale measurements from drawings when laying out the Work.
- .5 Coordinate requirements of, and connect to, equipment specified in other Sections, and to equipment supplied and installed by other

contractors or by Owner; uncrate equipment, assemble, move in place, and install complete, start-up and test.

- .2 Declarations: Coordinate declaration of Substantial Performance and Total Performance with requirements of the General Conditions and Supplementary Conditions of Contract.

1.4 Submittals

- .1 Provide required information in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Construction Clarification Drawings: Coordinate construction coordination requirements as follows:
 - .1 Prepare drawings in conjunction with all trades concerned, showing sleeves and openings for passage through floor structure.
 - .2 Submit a schedule of construction drawings not later than three weeks after the award of Contract, indicating the anticipated date when the drawings will be submitted for approval.
- .3 Identify materials and equipment submittals by listing manufacturer, trade name, and model number, and as follows:
 - .1 Include copies of applicable brochure or catalogue material.
 - .2 Maintenance and operating manuals will not be considered as suitable submittal material.
 - .3 Leave space on shop drawing to accommodate Owners review stamp.
 - .4 Clearly mark each shop drawing with identical name or number where equipment is identified by name or number on drawings or in specifications.
 - .5 Clearly identify dimensional and technical data sufficient to verify that equipment meets specified requirements.
 - .6 Clearly identify wiring, piping, service connection data and motor sizes.
 - .7 Clearly mark each submittal sheet using arrows, underlining, or circling to indicate differences between specifications and options proposed for use in the Work, such as differences in sizes, types, model numbers, rating, capacities, and similar criteria.

- .8 Specifically note specified features included as a part of the submittal, such as special tank linings, pump seals, materials or painting.
- .9 Strike out non-applicable material.
- .4 Review shop drawings prior to submittal to Owner certifying that:
 - .1 Site measurements are verified and correct.
 - .2 Site construction criteria, materials, catalogue numbers and similar data are coordinated with shop drawings and requirements of the Work.
 - .3 Certify review of each shop drawing by placing Subcontractor's and Contractor's review stamps, date and signatures of responsible persons.
 - .4 Verify installed materials and equipment meet specified requirements where shop drawings are not provided to Owner for review.
- .5 Use of Imperial Units and Conversions in Submittals:
 - .1 Units expressed in these documents are written in Imperial Units; soft imperial conversions are used throughout.
 - .2 Submit shop drawings and maintenance manuals in Imperial Units; use same Imperial Units for submittals as stated in specification or drawings.
 - .3 Equivalent Nominal Diameters of Pipes – Metric and Imperial:
 - .1 Provide equivalent nominal Imperial sized pipe and provide adapters to allow compatible connections to SI Metric sized fittings, equipment and piping where pipes are specified with SI Metric dimensions and only Imperial sized pipes are available.
 - .2 Provide adapters to allow compatible connections between SI Metric pipes and new and existing pipes, fittings, and equipment when CSA approved SI Metric pipes are available and are provided.
 - .3 Record accurately on "as-built" documents the type of pipe installed.
 - .4 SI Metric Duct Sizes:

- .1 Metric duct sizes are expressed as 25 mm = 1 inch.
- .6 Submit marked up drawing of reflected ceiling plan indicating location of access doors in ceilings prior to pipe and duct installation.

1.5 Quality assurance

- .1 Qualifications: Provide proof of qualifications when requested by Owner:
 - .1 Quality of Material and Equipment: Verify that materials and equipment installed are new, full weight and of quality specified; use same brand or manufacturer and model for each specific application; allow reinstalled existing materials and equipment are fully reconditioned using parts from same manufacturer of specific piece of equipment or system:
 - .1 Verify that the manufacturer's name, address, catalogue and serial number appear on each major component of equipment in a conspicuous place.
 - .2 Replace materials or workmanship below specified quality and relocate work wrongly placed to satisfaction of Owner and at no cost to Owner.
 - .3 Install materials and equipment in a quality manner providing good workmanship by competent tradesmen.
 - .4 Price submitted for this contract includes the use of materials and equipment as specified or as contained within the listing of Acceptable Materials contained in specification Sections.
 - .2 Availability of Material and Equipment: Notify Owner in writing a minimum of ten (10) days prior to Bid Closing Date of any materials specified that are required to complete Work and that are not currently available or will not be available for use as specified in these documents as follows:
 - .1 Bid submission denotes that specified products are available to meet specified requirements.
 - .2 Acceptance of Bid obliges Contractor and Subcontractors to place orders and provide specified products in a timely manner to meet Project Schedule.
 - .3 Failure to secure specified products will not relieve Contractor and Subcontractor's from providing acceptable

substitutions, including other associated costs to secure substitute products, at no additional cost to Owner or impact on Project Schedule.

- .2 Proposed Substitutions to Specified Material and Equipment:
 - .1 Acceptance of proposed substitutions to specified products will be based on evaluation of equal or better performance and materials to those specified in every respect, operate as intended, meet the space, capacity, and noise requirements outlined, and require no changes to the structure or configuration of adjacent assemblies or materials.
 - .2 Contractor is fully responsible for costs for work or materials required by Subcontractor or other contractors to accommodate use of materials or equipment other than those specified.

1.6 Warranty

- .1 Provide a written warranty stating that Work executed in this Contract will be free from defective workmanship and materials for a period of two (2) years starting from the date of substantial performance of work in accordance with the requirements specified in Section 01 78 00 – Closeout Submittals.
- .2 Warranty makes provision for repair or replacement of any Work that fails or becomes defective during the term of the warranty, providing the operating and maintenance instructions have been complied with by the Owner.
- .3 Duration of the warranty specified does not, in any way, supplant any other guaranties or warranties provided under the Contract for individual pieces of equipment or systems having a longer period provided by Manufacturers or as called for in the project documents.
- .4 Unless specified otherwise, Owner will be responsible for routine maintenance requirements as required in the manufacturer's instructions, and will be responsible for supplying filters, grease and belts and other consumables required for routine maintenance.

2 Products – not used

3 Execution

3.1 Examination of existing conditions

- .1 Visit and examine the site and note characteristics and features affecting the Work before submitting Bid.
- .2 Report discrepancies in writing to Owner prior to Bid closing.
- .3 No allowances will be made for difficulties encountered or expenses incurred arising from conditions of the site or existing items that are readily visible or known to exist at the time of Bid.
- .4 Failure to advise Owner of discrepancies in writing will mean that Contractor accepts documents as presented without potential of additional costs.
- .5 Unforeseen conditions or discrepancies that could not be readily ascertained at the time of Bid will be administered as a change to the Contract.

3.2 Cutting and patching

- .1 Coordinate requirements of the Work with Section 01 73 29 – Cutting and Patching.
- .2 Provide inserts, holes and sleeves, cutting and fitting required for mechanical work; relocate improperly located holes and sleeves.
- .3 Provide inserts or drill for expansion bolts, hanger rods, brackets, and supports.
- .4 Obtain written approval from Owner before drilling, coring, cutting or burning structural members; verify that post tensioned or pre-stressed strands are located accurately and avoid cutting or damaging these elements with an adequate margin of safety.
- .5 Provide openings and holes required in precast concrete members for mechanical work; cast holes larger than 100 mm in diameter; field-cut holes smaller than 100 mm when location is approved by Owner.

- .6 The Subcontractor is responsible to patch and make good building where damaged from equipment installation, improperly located holes and similar criteria.

3.3 Equipment protection and clean-up

- .1 Protect equipment and materials in storage on site during and after installation until final acceptance; leave factory covers in place; take special precautions to prevent entry of foreign material into working parts of piping and duct systems.
- .2 Protect equipment with polyethylene covers and crates.
- .3 Operate, drain and flush out bearings and refill with new change of oil, before final acceptance.
- .4 Clean piping, ducts and equipment of dirt, cuttings and other foreign substances.
- .5 Protect bearings and shafts during installation: Grease shafts and sheaves to prevent corrosion. Supply and install necessary extended nipples for lubrication purposes.
- .6 Verify that existing equipment being turned over to Owner or reused is carefully dismantled and not damaged or lost; do not reuse existing materials and equipment unless specifically indicated.

3.4 Temporary or trial usage of permanent systems

- .1 Temporary or trial usage requested by Owner of mechanical equipment supplied under contract will not represent acceptance by Owner; operate and maintain equipment and systems during trial usage in a manner that preserves the manufacturer's warranty/guaranty.
- .2 Repair or replace equipment damaged as a result of defective materials or workmanship during temporary or trial usage; coordinate with Section 01 52 00 for requirements associated with protection and reconditioning of permanent equipment and systems used during construction.
- .3 Pre-test operation of ventilation systems by running the units in a 100% fresh air, 100% exhaust air mode after distribution ductwork is installed.

- .4 Arrange for and conduct a sound meter and test sound levels in locations selected by Owner during the trial use test of the ventilation system.
- .5 Owner to approve ventilation system trial use date.

3.5 Site utility services

- .1 Maintain liaison with Owner to interrupt, re-route, or connect to water, sewer, heating, or gas systems, with minimum interruption of services.
- .2 Confirm elevations and locations of existing services prior to and during excavation.
- .3 Provide Owner with as-built drawings of site services; dimensioned to grid lines, building exterior walls or other permanent building component.

End of section

1 General

1.1 Summary

- .1 This Section includes procedures and cleaning solutions for cleaning mechanical piping systems including, but not limited to, the following:
 - .1 Provide for flushing and disinfection of domestic water systems.
 - .2 Isolate and bypass equipment as required to complete work of this Section.

1.2 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 Data: Submit literature having complete description of proposed chemicals, quantities, calculations, procedures, test kits and equipment supplied, and copies of data sheets, procedure instructions and analysis reports proposed for use in the Work.; submit within ten (10) workings days of the award of Contract.
 - .2 Reports:
 - .1 Provide written reports containing procedure of system cleaning and degreasing, giving times, dates, conditions of water and problems and actions encountered.
 - .2 Submit written reports to the Constructor, Owner and Mechanical Subcontractor containing results of tests taken every seven (7) days after completion of chemical treatment; perform tests every seven (7) days for a minimum time period of thirty-five (35) days.

1.3 Quality assurance

- .1 Perform the cleaning and degreasing operation on site in conjunction with the mechanical contractor and submit written reports on all situations found, actions taken and final results. Provide signed reports by the contractor, chemical treatment agency, and commissioning agency. Inform the Owner and commissioning agency fifteen (15) working days prior to commencing of work.

2 Products

2.1 Materials

- .1 System Cleaner: Alkaline compound which in solution removes grease and petroleum products.
- .2 Closed System Treatment: Sequestering agent to reduce deposits and adjust PH, and a corrosion inhibitor.

3 Execution

3.1 Acceptable agencies

- .1 Chemical treatment agencies will be responsible for providing all equipment, chemicals and site supervision to fully comply with all requirements and their intent contained within this specification section.
- .2 Chemical treatment agencies offering products that may be incorporated into the Work include, but are not limited to, the following:

3.2 Manufacturer's instructions

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

3.3 System cleaning

- .1 Ensure reasonable care is exercised to prevent debris, dirt and other foreign material from entering the pipe during construction. This is to include proper protection of piping on site prior to installation, temporary caps on partial systems, and complete evacuation of moisture within systems being hydrostatically pressure tested.
- .2 Make systems completely operational, totally filled, thoroughly vented, and completely started.
- .3 Inspect, clean of sludge and flush all low points with clean water after cleaning and degreasing process is completed. Include disassembly of components as required. All cleaning and flushing of low points, coils and boilers shall be done prior to final fill and chemical treatment.

3.4 Domestic hot, cold and domestic recirculation water systems

- .1 All domestic hot, cold and domestic recirculation water systems will be required to be flushed and disinfected. Add chlorine to water in system to 50 milligrams per litre (50 ppm) and let stand for 24 hours. Check chlorine content after 24 hours and insure the content is not less than 20 milligrams per litre (20 ppm). If less than 20 milligrams per litre (20 ppm) repeat process. Flush system until the chlorine content of water being drained is equal to the chlorine content of the make-up water. Utilize plumbing fixtures (i.e. lav, sinks, flushometers, and similar criteria.) for drainage.

End of section

1 General

1.1 Reference Standards

- .1 ASTM International Inc.
 - .1 ASTM D 2235-04, Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
 - .2 ASTM D 2564-04e1, Standard Specification for Solvent Cements for Poly(Vinyl-Chloride) (PVC) Plastic Piping Systems.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-Series B1800-06, Thermoplastic Nonpressure Pipe Compendium - B1800 Series.
- .3 Green Seal Environmental Standards (GSES)
 - .1 Standard GS-36-00, Commercial Adhesives.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 National Research Council Canada (NRC)
 - .1 National Plumbing Code of Canada, latest edition (NPC).

1.2 Submittals

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and datasheets for piping and adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Provide copies of WHMIS MSDS - Material Safety Data Sheets.

1.3 Delivery, Storage and Handling

- .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

- .2 Store at temperatures and conditions recommended by manufacturer.

2 Products

2.1 Piping and Fittings

- .1 For DWV piping to:
 - .1 CAN/CSA B1800.

2.2 Joints

- .1 Solvent weld for PVC: to ASTM D 2564.
- .2 Solvent weld for ABS: to ASTM D 2235.

3 Execution

3.1 Application

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 Installation

- .1 Install in accordance with Provincial Plumbing Code and local authority having jurisdiction.

3.3 Performance Verification

- .1 Ensure fixtures are properly anchored, connected to system and effectively vented.

3.4 Cleaning

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

End of section

1 General

1.1 Summary

- .1 This Section includes requirements for supply and installation plumbing fixtures and related components including the following:
 - .1 Plumbing fixtures and trim
 - .2 Fixture carriers
 - .3 Other fittings listed in this section
 - .4 Accessory materials required by fittings, fixtures and trims for complete and functioning installation.

1.2 Related requirements

- .1 Section 06 20 00 – Finish Carpentry and Millwork: Plumbing fixtures installed as a part of cabinetry.

1.3 Administrative requirements

- .1 Coordination: Coordinate roughing-in and final plumbing fixture locations, and verify that fixtures can be installed to comply with original design and referenced standards and as follows:
 - .1 Verify location and size of fixtures with millwork shop drawings for plumbing fixtures and trim being built-in to other components of the work.
 - .2 Verify opening dimensions before starting any rough-in work or installation for plumbing fixtures and trim being built-in to other components of the work.

1.4 Reference standards

- .1 Canadian Standards Association (CSA):
 - .1 CSA B651-18, Accessible Design for the Built Environment

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 manufacturer's product data identifying the following for each fixture type specified:
 - .1 Fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports
 - .2 Materials and finishes, dimensions, construction details, and flow control rates
 - .2 Shop Drawings: Submit shop drawings indicating power, signal, and control wiring and differentiate between manufacturer installed and site installed wiring.

1.6 Quality assurance

- .1 Regulatory Requirements: Provide materials that are acceptable to Authority Having Jurisdiction and as follows:
 - .1 Plumbing Fixtures: Listed and labelled CSA approved materials with labels visible prior to installation.
 - .2 Accessibility Standards: Provide plumbing fixtures that meet requirements of CAN/CSA B651 and that provide barrier free access to plumbing fixtures for people with disabilities.
- .2 Qualifications: Provide proof of qualifications when requested by Owner:
 - .1 Source Limitations: Provide new fixtures, free from flaws and blemishes with finished surfaces clear, smooth and bright; visible parts of fixture brass and accessories heavily chrome plated; with fixtures and fittings of same type from one product manufacturer and as follows:
 - .1 Compatibility: Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.
 - .2 Exception: Obtain similar products from other manufacturers specified for that category if fixtures, faucets, or other components are not available from a single manufacturer.

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; manufacturers listed as additional Acceptable Products and that offer similar products may be incorporated

into the work of this Section provided they meet the performance requirements established by the named products.

- .2 Additional Acceptable Manufacturers: Subject to compliance with performance requirements specified in this Section; as established by the Basis-of-Design Products, use any of the listed manufacturers' products; following manufacturer's do not require submission of a request for substitutions provided required shop drawing and product data submissions are submitted before starting any work of Section:
 - .1 Flush Valves:
 - .1 Sloan Valve Company
 - .2 Presto
 - .3 Cambridge Brass
 - .4 Zurn Engineered Water Solutions
 - .5 Toto
 - .6 Or approved alternate
 - .2 Plumbing Brass:
 - .1 Symmons
 - .2 American Standard
 - .3 Cambridge Brass
 - .4 Delta
 - .5 Waltec
 - .6 Kohler
 - .7 Or approved alternate
 - .3 Undermount Vitreous China Sinks (White):
 - .1 Kohler, Verticyl K-2882
 - .2 Or approved alternate
 - .4 Water Closets, elongated pressure-assisted toilet:
 - .1 American Standard: Cadet FloWise Right Height Elongated pressure-assisted toilet 1.1gpf/ 4.2 Lpf, 2467.1 with tank, tank cover; Vitreous China, white; seat 5321.110 EverClean.
 - .2 Or approved alternate
 - .5 Universal Water Closet:
 - .1 American Standard: Cadet FloWise Right Height Elongated pressure-assisted toilet 1.1gpf/ 4.2 Lpf, 3483.001 with tank, tank cover; Vitreous China, white; seat 5321.110 EverClean.

-
- .2 Or approved alternate
 - .6 Urinals
 - .1 Amercian Standard: Trimbrook 1.0 gpf/3.8 Lpf Top Spud Siphon Jet Urinal; Vitreous China, White.
 - .2 Or approved alternate
 - .7 Electric Faucets:
 - .1 Kohler: Sculpted touchless single-hole lavatory faucet with Insight sensor technology, HES-powered, with temperature mixer, 0.35 gpm, Polished Chrome, K-7515-SATA-CP.
 - .2 Or approved alternate
 - .3 Substitutions: Owner may consider additional manufacturers having similar products to Acceptable Products Manufacturers listed above during the construction period, provided they meet the performance requirements established by the named products and provided they submit requests for substitution to the Owner before starting any work of this Section:
 - .1 Do not use substitute materials to establish Bid Price.
 - .2 Substitutions that appear as a part of the project without review and acceptance by the Owner will be rejected and replaced with one of the specified materials.

3 Execution

3.1 Examination

- .1 Examine roughing-in for water soil and for waste piping systems and supports to verify actual locations and sizes of piping connections and that locations and types of supports match those indicated, before plumbing fixture installation.
 - .1 Examine walls, floors, and cabinets for suitable conditions where fixtures are being installed; proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Fixture Installation

- .1 Assemble fixtures, trim, fittings, and other components according to manufacturers' written instructions and as follows:
 - .1 Install each fixture with its own trap, easily removable for servicing and cleaning. At completion thoroughly clean plumbing fixtures and equipment.

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- .2 Provide chrome plated rigid or flexible supplies to fixtures with screw driver stops, reducers and escutcheons.
 - .3 Install wall mounted urinals with approved wall carriers.
 - .4 Caulk gap between urinal and water closet, and wall or floor with silicone sealant.
 - .5 Provide pressure reducing valves on water lines to fixtures which are not rated for the system operating pressures.
 - .2 Wall-Hanging Fixtures: Install off-floor supports fixed to building substrates and as follows:
 - .1 Use carrier supports with waste fitting and seal for back-outlet fixtures.
 - .2 Use carrier supports without waste fitting for fixtures with tubular waste piping.
 - .3 Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.
 - .3 Install back-outlet, wall-hanging fixtures onto waste fitting seals and attach to supports.
 - .4 Install floor-mounting fixtures on closet flanges or other attachments to piping or building substrate.
 - .5 Install wall-hanging fixtures with tubular waste piping attached to supports.
 - .6 Install floor-mounting, back-outlet water closets attached to building floor substrate and wall bracket and onto waste fitting seals.
 - .7 Install counter-mounting fixtures in and attached to casework.
 - .8 Install fixtures level and plumb according to manufacturers' written instructions and roughing-in drawings.
 - .9 Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping:
 - .1 Attach supplies to supports or substrate within pipe spaces behind fixtures.
 - .2 Install stops in locations where they can be easily reached for operation.
 - .3 Exception: Use ball, gate, or globe valve if stops are not specified with fixture.
 - .10 Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.

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- .11 Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.
 - .12 Install flushometer valves for accessible water closets and urinals with handle mounted on wide side of compartment:
 - .1 Install other actuators in locations that are easy for people with disabilities to reach.
 - .13 Install tanks for accessible, tank-type water closets with lever handle mounted on wide side of compartment.
 - .14 Install toilet seats on water closets.
 - .15 Install faucet-spout fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
 - .16 Install water-supply, flow-control fittings with specified flow rates in fixture supplies at stop valves.
 - .17 Install faucet, flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns; include adapters if required.
 - .18 Install traps on fixture outlets:
 - .1 Exception: Do not install trap on fixtures with integral traps.
 - .2 Exception: Do not install trap on indirect wastes, unless otherwise indicated.
 - .19 Install disposer in outlet of sinks indicated to have disposer. Install switch where indicated or in wall adjacent to sink if location is not indicated.
 - .20 Install hot-water dispensers in back top surface of sink or in counter with spout over sink.
 - .21 Install escutcheons at piping wall ceiling penetrations in exposed, finished locations and within cabinets and millwork and as follows:
 - .1 Use deep-pattern escutcheons if required to conceal protruding fittings.
 - .22 Seal joints between fixtures and walls, floors, and counters using sanitary-type, one-part, mildew-resistant, silicone sealant and as follows:
 - .1 Match sealant colour to fixture color.
 - .2 Refer to Section 07 92 00 for sealant and installation requirements.

3.3 Connections

- .1 Piping installation requirements are specified in other Division 22 Sections; drawings indicate general arrangement of piping, fittings, and specialties.
- .2 Connect water supplies from water distribution piping to fixtures.
- .3 Connect drain piping from fixtures to drainage piping.
- .4 Supply and Waste Connections to Plumbing Fixtures:
 - .1 Connect fixtures with water supplies, stops, risers, traps, and waste piping.
 - .2 Use size fittings required to match fixtures.
 - .3 Connect to plumbing piping.
- .5 Supply and Waste Connections to Fixtures and Equipment Specified in Other Sections:
 - .1 Connect fixtures and equipment with water supplies, stops, risers, traps, and waste piping specified.
 - .2 Use size fittings required to match fixtures and equipment.
 - .3 Connect to plumbing piping.
- .6 Ground Equipment: Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.

3.4 Site quality control

- .1 Verify that installed fixtures are categories and types specified for locations where installed.
- .2 Check that fixtures are complete with trim, faucets, fittings, and other specified components.
- .3 Inspect installed fixtures for damage. Replace damaged fixtures and components.
- .4 Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.
- .5 Install fresh batteries in sensor-operated mechanisms.

3.5 Closeout activities

- .1 Adjusting:

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- .1 Operate and adjust faucets and controls; replace damaged and malfunctioning fixtures, fittings, and controls and as follows:
 - .1 Operate and adjust disposers, hot-water dispensers, and controls. Replace damaged and malfunctioning units and controls.
 - .2 Adjust water pressure at faucets to produce proper flow and stream.
 - .3 Replace washers and seals of leaking and dripping faucets and stops.
 - .2 Cleaning:
 - .1 Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials and as follows:
 - .1 Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.
 - .2 Remove sediment and debris from drains.

3.6 Protection

- .1 Provide protective covering for installed fixtures and fittings and as follows:
 - .1 Protect fixtures against use and damage during construction.
 - .2 Do not allow use of fixtures for temporary facilities unless approved in writing by Owner.

3.7 Fixtures rough-in schedule

- .1 Rough-in fixture piping connections in accordance with the following table of minimum sizes:

Fixture Type	Usage	Comments
Water Closets	Standard	375 mm to top of bowl rim
	Barrier Free	400 mm to 460 mm to top of seat
Urinal	Standard	550 mm to top of bowl
	Barrier Free	488 mm to 512mm to top of rim
Water Closet Flush Valves	Standard	275 mm minimum above bowl rim
	Recessed	254 mm minimum above bowl rim

- .2 Mount fixtures in accordance with the reference standards listed in the following heights above finished floor:

Fixture Type	Usage	Comments
Water Closets	Standard	375 mm to top of bowl rim
	Barrier Free	460 mm to top of seat
Urinal	Standard	550 mm to top of bowl
	Barrier Free	430 mm maximum to top of rim
Water Closet Flush Valves	Standard	275 mm minimum above bowl rim
	Recessed	254 mm minimum above bowl rim

End of section

1 General

1.1 Summary

- .1 Provide electrical provisions for contract requirements and documentation provisions.

1.2 Related requirements

- .1 Drawings and General Conditions of the Contract, including Supplementary Conditions and Division 01 – General Requirements specification sections, affect all Work of Division 25 – Integrated Automation, Division 26 – Electrical, Division 27 – Communications and Division 28 – Electronic Safety and Security.
- .2 Specific requirements of the following Specification Sections apply directly to the General Electrical Provisions of this Section:
 - .1 Section 01 31 19 – Project Meetings: Constructor's meetings required for site safety and project coordination.
 - .2 Section 01 32 00 – Construction Progress Documentation: Constructor's requirements for project schedules and progress information.
 - .3 Section 01 33 00 – Submittal Procedures
 - .4 Section 01 73 00 – Execution
 - .5 Section 06 10 53 – Miscellaneous Rough Carpentry
 - .6 Section 09 91 00 – Painting: Site painting of electrical work.
 - .7 Section 20 05 00 – Common Work Results for Mechanical: Connections to mechanical equipment.

1.3 Definitions

- .1 Provide: The term Provide as used in this Division means to supply, install and make operable.

1.4 Reference standards

- .1 Canadian Standards Association (CSA):
 - .1 Model National Energy Code of Canada for Buildings, 1997
 - .2 CSA C22.1-12, Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations
- .2 Institute of Electrical and Electronic Engineers (IEEE):

- .1 IEEE C37.90-2005, Standard for Relays and Relay Systems Associated with Electric Power Apparatus
- .2 IEEE C37.90.1-2002, Standard Surge Withstand Capability (SWC) Tests for Protective Relays and Relay Systems
- .3 IEEE C37.90.2-2004, Standard for Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers
- .4 IEEE C37.90.3-2001, Standard for Electrostatic Discharge Tests for Protective Relays

1.5 Administrative requirements

- .1 Coordination of Permits, Certificates and Fees: On completion of the work, submit certificate of acceptance from inspection authority to the Consultant:
 - .1 Prior to commencement of work, submit the necessary drawings to the Electrical Inspection Department and the Electrical Supply Authority.
 - .2 Pay all associated fees.
- .2 Coordination with Drawings and Specifications:
 - .1 Electrical Drawings and Specifications are governed by the General Conditions of the Contract and General Requirements listed in Divisions 00 and 01, and are complementary to all other drawings and specifications forming a part of the project documentation, and shall be used as follows:
 - .1 Drawings indicate schedules, details and floor plans that identify the general location of lights, switches, receptacles, equipment, and other electrical items.
 - .2 Drawings shall be read in conjunction with the Specifications to determine complete scope of work required by Division 26 – Electrical; drawings and specifications are complementary to each other and what is called for by one shall be binding as if called for by both.

- .3 Drawings and Specifications for Work covered by Division 26 shall be coordinated between individual Sections for this work, and with other Divisions of the Work to identify potential conflicts between other systems or structural components.
 - .4 Obtain a clarification or ruling from the Consultant should any discrepancy occur between Drawings and Specifications before submitting bid.
 - .5 No additional payment will be considered where clarifications are not requested in this manner, and a subsequent conflict arises between Division 26 Sections or Work of other Divisions affected by or affecting Divisions 26 that could have been identified during the bid period.
 - .6 Conflicts that arise as a result of construction activities will be considered as a Change to the Work and will be administered in accordance with the General Conditions of the Contract.
- .2 Drawings and Specifications form an integral part of the Contract Documents and will serve as the working documents for the Project, subject to the following limitations:
- .1 Drawings only indicate the general layout of the complete electrical system, arrangement of feeders, circuits, outlets, switches, controls, panel boards, distribution centres, fixtures and other work.
 - .2 Drawings only indicate the general location and route followed by conduit or wiring, and cannot show all structural, mechanical and as-constructed details that may affect Divisions 26 Work.
 - .3 Bring discrepancies or conflicts shown on different plans, or between plans and specifications promptly to the attention of the Consultant for a decision before proceeding with Work.
 - .4 Systems and items indicated on Drawings and Specifications are only nominally described and may not be completely specified or noted, however, where additional components are obviously necessary to make a complete working installation, they shall be included as if specified in their entirety.

- .5 Drawings indicate various electrical devices, particularly wall mounted devices, that take up more space on the Drawings than the device does in the actual installation:
 - .1 This allows the Drawings to provide sufficient detail and a maximum degree of clarity when indicating the intent of work using symbols.
 - .2 Drafting limitations allow only for indication of symbolic locations rather than exact physical locations of the devices.
 - .3 Devices shall be installed with prime regard for convenience of operation and the best usage of wall space for this and other purposes rather than stringing the devices out along a wall so as to coincide with the scaled locations of the symbols.
 - .4 Coordinate and confirm locations of devices and fixtures provided by other Divisions of Work, and confirm location of devices with Consultant before completing installation.
- .6 Electrical junction boxes in the ceiling spaces which are to be located in the concealed ceiling spaces must be coordinated with the consultants prior to rough-in. Access to ceiling spaces is not permitted in some spaces, therefore all electrical junction boxes in such spaces will have to be grouped and installed at locations which are accessible.

1.6 Submittals

- .1 Provide required shop drawings and other submittals information in accordance with Section 01 33 00.
- .2 Submit shop drawings and other relevant submittals for approval by electrical utilities and authorities having jurisdiction before submission to Consultant, and as follows:
 - .1 Include electrical Subcontractor's delegated design engineering stamp and electrical utility's approvals where required.
 - .2 Details of construction, dimensions, capacities, weights, all electrical data and performance characteristics.
 - .3 Wiring diagrams, control schematics and descriptions of operation.

- .3 Action Submittals: Submit shop drawings for the following; but not limited to, and any additional shop drawings requested in individual technical sections:
 - .1 Primary and secondary switchgear, including panel board, disconnect switches, circuit breaker and fuse details and tripping characteristics, instrument transformers and protection relays, and related equipment, and at least the following drawings:
 - .1 Physical sizes, assemblies, and weights of components
 - .2 Single line and three-line drawings
 - .3 Wiring diagrams
 - .4 Schematic and control diagrams
 - .2 Motor control centres and all motor control equipment including starters, contractors, overload heater data, control relays, time delay relays, motor circuit and control circuit fuses/breakers, as applicable pilot lights, control transformers and selector switches, etc. Include also complete motor control schematics.
 - .3 All wiring devices including receptacles and switches.
 - .4 All equipment and wiring data of low voltage switching system, and exterior lighting controls, including control and interconnection schematics and descriptions of operation.
 - .5 Schedule of all nameplates.
- .4 Construction Clarification Drawings: Coordinate construction coordination requirements with Division 1; Provide required information in accordance with Section 01 33 00, and as follows:
 - .1 Prepare drawings in conjunction with all trades concerned, showing sleeves and openings for passage through floor structure.
 - .2 Prepare composite construction drawings, fully dimensioned in metric, indicating cable, conduit, bus duct, shafts, mechanical and electrical equipment rooms, including switchgear rooms, ceiling spaces and all other critical locations to avoid a conflict of trades. Base equipment drawings upon shop drawings and include, but do not necessarily limit to, all details pertaining to clearances, access, sleeves, electrical connections, location and elevation of pipes, ducts, conduits, etc., obtained from consultation with and agreement of the trades involved.

- .3 Prepare a complete set of drawings showing all conduit runs and wiring using the information provided in riser diagrams, circuit numbers on floor plans, relevant details, specifications and with reference to drawings of other trades.
- .4 Submit a schedule of construction drawings not later than three weeks after the award of Contract, indicating the anticipated date when the drawings will be submitted for approval.

1.7 Project closeout submissions

- .1 Record Drawings and Specifications (As-Built): Submit record drawings in accordance with the requirements of Section 01 78 00; provide the following as a minimum:
 - .1 Inverts of all services entering and leaving the building and at property lines.
 - .2 Dimensions of underground services in relation to building lines at key points of every run.
 - .3 Elevations of underground services in relation to ground floor level of the building.
 - .4 Exact dimensioned location of all services embedded in the structure.
 - .5 Exact dimensioned location of all services left for future work.
 - .6 All changes to the work during construction and ensure that corrections are made on floor plans and riser diagrams, etc., as applicable.
 - .7 All conduit and wiring and all deviations from circuit numbers shown on the Contract Documents.
 - .8 For the sake of clarity, produce separate lighting, power and communications drawings and show all conduit and wiring.
 - .9 Revise or draw new riser and connection diagrams as necessary to indicate actual site conditions.
 - .10 Revise motor control schedules, motor control centre elevations and schematic as necessary.

1.8 Quality assurance

- .1 Standards Organizations: Reference is made to the following standards organizations within the text of these specifications:
 - .1 American National Standards Institute (ANSI)
 - .2 Canadian Standards Association (CSA)
 - .3 Electrical Equipment Manufacturers Advisory Council (EEMAC) of the Electro-Federation of Canada (EFC)
 - .4 Institute of Electrical and Electronic Engineers (IEEE)
 - .5 Insulated Cable Engineers Association (ICEA)
 - .6 National Electrical Manufacturers Association (NEMA)
- .2 Regulatory Requirements: Materials used for this Project shall carry labels indicating CSA approval and conform to EEMAC Standards where specifically specified; equipment wiring and wiring devices shall meet the requirements of CSA C22.1, Safety Standard for Electrical Installations:
 - .1 The requirements of the Canadian Electrical Code shall take precedence in any instance in this Specification or on the Drawings where material or construction methods called for are less than minimum requirements of the Code.
 - .2 Supply and install materials, and perform the work as though called for to minimum Code standards.
- .3 Performance Requirements: Comply with the requirements of all provincial and local authorities having jurisdiction, and as follows:
 - .1 Perform work on overhead and underground systems in accordance with CSA C22.3 Series of Standards except where specified otherwise as exceeding the minimum requirements contained in the standards.
 - .2 Electronic Equipment: Electronics and other sensitive system and equipment must be surge protected in accordance with the requirements set forth in IEEE C37.90 Series of Standards relating to testing withstand power surges, and as follows:

- .1 Systems and equipment that may be adversely affected by short duration power blackouts (such as during lightning storms) shall be capable of maintaining data integrity for a disturbance of up to two seconds by means of an internal battery back up to the memory or microprocessor components, or other suitable means.

2 Products

2.1 Materials

- .1 Where materials or equipment are specified by the technical description only without reference to manufacturer or trade name, these shall be of the best commercial quality obtainable for the purpose.
- .2 Where materials are specified by reference to "Acceptable Materials" or similar words, use any one of the materials listed maintaining same source of supply and manufacture where related products are used in a system, as follows:
 - .1 Where equipment or materials are specified by manufacturer or trade name, this is for the purpose of establishing a standard of quality and Subcontractors quoting on materials other than those specified or approved for substitution do so at their own risk.
 - .2 Manufacturers named as acceptable materials are required to comply completely with the intent of the specifications, even if this implies custom made products or standard products modified to comply.
 - .3 Naming an acceptable material does not imply that a standard product of the manufacturer will be accepted. If it deviates from the specifications in any way whatsoever, the standard product will not be approved for use on the project.
 - .4 Any substitute material or equipment installed without prior approval or acceptance from the Consultant will be removed and replaced at Subcontractor's expense with the acceptable material selected by the Consultant.

- .3 Material and equipment of any particular service shall be by one manufacturer only. Do not indiscriminately mix equipment of different manufacturers.
- .4 Materials installed in hazardous locations, shall be suitable for area classifications defined.

2.2 Fastenings and supports

- .1 All equipment loads imposed on the building structure must be reviewed by the Consultant.
- .2 All supports and attachments to the building structure are the Subcontractor's responsibility and shall be designed by a professional engineer registered in the Province of the Work.
- .3 Coordinate fastening and anchorage requirements with Section 01 73 00.

2.3 Access doors

- .1 Provide access doors for electrical equipment, junction boxes, and controls as required to provide access for servicing and maintenance.
- .2 Supply access doors for placing by trade whose work these panels are installed in:
 - .1 Access doors shall be of a size to permit ease of maintenance or adjustment of equipment and shall be of a minimum of 305 mm x 305 mm size.
 - .2 Fabricate exposed metal doors and flanges from 1.5 mm steel, suitable for painting where required.
 - .3 Access doors in plastered walls and ceilings shall have integral plaster ground and 76 mm wide expanded metal lath on four sides.
 - .4 Access doors in non-rated, architecturally finished gypsum board walls shall be aluminum framed with gypsum board infill, flush mounted type.
 - .5 Block, brick and wood walls: 19 mm exposed flange.
 - .6 Ceramic tile walls: stainless steel access door, 19 mm exposed flange.
 - .7 Acoustical tile ceilings: recessed to accept a tile flush with adjacent tile, complete with plastic grommet in tile for access to operator.
 - .8 Acoustical plaster ceilings: 19 mm wide expanded metal lath on four sides.

- .3 Where possible install ceiling junction boxes in services rooms and accessible false ceiling spaces to minimize the use of access doors.
- .4 Maintain access to all existing junction boxes.

3 Execution

3.1 Workmanship

- .1 Work shall be performed in a professional and workmanlike manner in accordance with applicable building codes and professional industry standards, and comply with the minimum standards set forth in the Canadian Electrical Code, except where these specifications indicate a higher degree of workmanship in excess of the minimum requirements including, but not limited to, the following:
 - .1 Exposed conduit runs including runs in ceiling spaces shall be perpendicular or parallel to the building lines.
 - .2 Panels, boxes, covers, and other wall mounted items shall be installed plumb and level using spirit levels and plumb bobs.
 - .3 Immediately replace bolts or nuts that have been "stripped" or "cross threaded".
 - .4 Do not connect dissimilar metals together.
 - .5 Do not use corrosive materials in wet or damp locations.
 - .6 Conceal all electrical rough-in in public areas, unless specific request is made in writing to the Consultant stating which adjustments are required, and approval is granted before proceeding with work.

3.2 Protection

- .1 Protect all finished and unfinished work of this and other Divisions from damage due to carrying out of this work.
- .2 Keep equipment dry and clean at all times.
- .3 Cover openings in equipment and materials.
- .4 Be responsible for and make good any damage caused directly or indirectly to walls, floors, ceilings, woodwork, brickwork, finishes, etc.
- .5 Store switchgear, transformers and sensitive electrical equipment in a dry heated location.

3.3 Inspection of work/tests

- .1 Before energizing any portion of the electrical system, perform megger tests on all feeders and branch circuits. Results shall conform to Canadian Electrical Code, and be in accordance with the requirements of the authorized inspection authority and the Consultant.
- .2 Perform all necessary tests to confirm the correct operation of all systems including but not necessarily limited to the following:
 - .1 Power distribution and generation including testing and coordination of all protective devices by the relevant manufacturers. Submit manufacturer's coordination study to Consultant for review, at the same time as switchgear shop drawings.
 - .2 Test all meters, control devices, breaker auxiliary contacts and operation, meter scaling and associated instrument transformer ratios including remote control devices.
 - .3 Circuit breakers employing electrical trip and/or electrical close functions shall be tested to ascertain correct operation including any interlocking devices that may be part of that function.
 - .4 Lighting systems and controls.
 - .5 Motor controls.
 - .6 All systems, including fire alarm system, all communications systems, uninterruptable power/inverter systems and emergency power generation, etc.
 - .7 Grounding.
- .3 Submit letters from manufacturers of all systems indicating that they have checked, tested and verified the respective systems and are satisfied with the methods of installation, connection and operation.
- .4 Inform the consultant well in advance of the dates when the tests will be carried out.
- .5 Submit all test results in duplicate to the consultant for approval.
- .6 Upon completion of the building and immediately prior to final inspection and takeover, check load balance on all feeders and at distribution centres, panels, etc. Conduct tests by turning on all possible loads in the building and checking the load current balance. If load unbalance exceeds 15%, reconnect circuits to balance the load.

- .7 Perform voltage checks throughout the building and if directed by the Consultant, adjust the transformer tap settings.
- .8 In cooperation with the mechanical Subcontractor, take clip-on ammeter readings on all phases of all mechanical equipment motors with motors operating under full load conditions. Test readings shall be submitted to the Consultant.

3.4 Start-up

- .1 Instruct operating personnel in operation, care and maintenance of installation, at times arranged with the Consultant and the operating personnel.
- .2 Where specified herein and where necessary, arrange and pay for the services of the manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components:
 - .1 Provide these services as often as necessary to put installation in working order and to ensure that operating personnel are conversant with all aspects of operation, care and maintenance.
 - .2 Provide these services for such period and for as many visits as necessary to put equipment into operation and to ensure that operating personnel are conversant with its care and operation.
- .3 Single Line Electrical Diagrams:
 - .1 Provide single line electrical diagrams in black metal frames with clear acrylic front, and as follows:
 - .1 Electrical distribution system: locate in main electrical room.
 - .2 Electrical power generation and distribution systems: locate in generator room.
 - .2 Provide fire alarm riser diagram, plan and zoning of building in glazed frame at fire alarm control panel.

End of section

Appendix D, D-2 Material Disclosures

1. Drawings

Drawing List		
Sheet No.	Drawing Number	Drawing Title
1	A-000	TITLE PAGE
2	A-001	FLOOR 1 DEMOLITION PLAN
3	A-002	FLOOR 1 FINISH PLAN
4	A-003	FLOOR 1 PHASING PLAN
5	A-004	WASHROOMS – PLANS & ELEVATIONS
6	A-005	WASHROOMS – ENLARGED PLAN, SECTIONS & DETAILS

2. Asbestos

Contractors are advised that asbestos, which has been contained, is present on the job site. Please review the attached Pinchin Hazardous Building Materials Assessment report for detailed information. Any other designated substances, if any, known to be stored on site will be listed in this document under “List of designated substances at the site(s)” below.

Designated Substance	Identified on this Site?
Acrylonitrile	No
Arsenic	No
Asbestos	Yes
Benzene	No
Coke Oven Emissions	No
Ethylene Oxide	No
Isocyanate	No
Lead	Yes

Appendix D – RFT Particulars, D-2 Material Disclosures

Mercury	Yes
Silica	Yes
Vinyl Chloride	No

3. Designated Substances

A Designated Substances Survey Report prepared by Pinchin and dated September 9, 2024, is attached to the Tender Documents.

In accordance with the Region of Durham Corporate Health and Safety Policy and Program a list of designated substances must be provided to all Contractors.

Reference Appendix D-2, Section 2 for the list of Designated Substances.