

**City of Toronto
Cyber Command Centre**

55 John Street
12th Floor
Toronto, ON

Project No: 2024-001
Code: 24025
Issued for: Reissued for Tender
Date: July 31, 2024

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Toronto Corporate Security - Security Access C-Cure 9000® Programming Standards
Toronto Corporate Security – RFQ Drafting
HID® Signo™ Readers Specifications
Toronto Accessibility Design Guidelines
City of Toronto – Commercial Facilities Structured Cabling Systems Design Guide for Consulting Engineers, Architects,
Designers & Contractors
Room Data Sheets

END OF SECTION

Drawing No.	Document Name	Issued For	Issue Date
Interior Design			
ID0.01	Cover Page/Key Plan	Reiss. for Tender	July 31, 2024
ID0.02	Life Safety Plan	Reiss. for Tender	July 31, 2024
ID1.01.1	Demolition Plan	Reiss. for Tender	July 31, 2024
ID1.01.2	Ceiling Demolition Plan	Reiss. for Tender	July 31, 2024
ID1.02	Partition Plan	Reiss. for Tender	July 31, 2024
ID1.03	Reflected Ceiling Plan	Reiss. for Tender	July 31, 2024
ID1.04	Power and Communication Plan	Reiss. for Tender	July 31, 2024
ID1.05	Floor Finishes Plan	Reiss. for Tender	July 31, 2024
ID1.06	Wall Finishes Plan	Reiss. for Tender	July 31, 2024
ID1.07	Furniture Plan	Reiss. for Tender	July 31, 2024
ID1.08	Signage Plan	Reiss. for Tender	July 31, 2024
ID1.09	Signage Details	Reiss. for Tender	July 31, 2024
ID1.10	Signage Details	Reiss. for Tender	July 31, 2024
ID1.11	Signage Details	Reiss. for Tender	July 31, 2024
ID2.01	Partition Details and Ceiling Details	Reiss. for Tender	July 31, 2024
ID3.01	Door Schedule and Details	Reiss. for Tender	July 31, 2024
ID4.01	Millwork Elevations and Details	Reiss. for Tender	July 31, 2024
ID4.02	Millwork Elevations and Details	Reiss. for Tender	July 31, 2024
ID4.03	Millwork Details	Reiss. for Tender	July 31, 2024
ID5.01	Schedules	Reiss. for Tender	July 31, 2024
Structural			
S1.01	General Notes and Typical Details	Permit & Tender	July 24, 2024
S2.01	12 th and 13 th Floor Framing Plan and Section	Permit & Tender	July 24, 2024
Mechanical			
M001	Key Plan, Drawing List	Reiss. for Tender	July 31, 2024
M002	Mechanical Legend, Schedule, and Detail	Reiss. for Tender	July 31, 2024
M003	Mechanical Detail	Reiss. for Tender	July 31, 2024
M004	Plumbing and Fire Protection Demolition Plan	Reiss. for Tender	July 31, 2024
M005	Plumbing and Fire Protection New Plan	Reiss. for Tender	July 31, 2024
M006	HVAC Demolition Plan	Reiss. for Tender	July 31, 2024
M007	HVAC New Layout	Reiss. for Tender	July 31, 2024
Electrical			
E001	Key Plan, Drawing List	Reiss. for Tender	July 31, 2024
E002	Proposed Lighting Layout, Legend, Notes, Luminaire Schedule	Reiss. for Tender	July 31, 2024
E003	Proposed Power Layout, Legend, Notes, Details	Reiss. for Tender	July 31, 2024
E004	Panel Schedules, Door Details, A/V Details	Reiss. for Tender	July 31, 2024
E005	A/V Riser Diagram, Equipment Schedule, Cable Pull Schedule	Reiss. for Tender	July 31, 2024
E006	Lighting Demolition Layout, Legend, Demolition Specification	Reiss. for Tender	July 31, 2024
E007	Power Demolition Layout, Legend	Reiss. for Tender	July 31, 2024

END OF SECTION

1. Summary of Work

- 1.1 Work to be undertaken in accordance with a construction schedule to be provided by Contractor/ Construction Manager and in coordination with the Project Schedule provided by the Consultant. Project Scheduled is summarized below. Refer to full Project Schedule for further information and any changes.
- .1 Contractor starts December 1, 2024
 - .2 Substantial performance June 1, 2025
 - .3 Furniture, data, and A/V installation June 2, 2025 – July 1, 2025
 - .4 Testing July 2, 2025 – July 14, 2025
 - .5 Client move-in July 15, 2025
- 1.2 The Contractor/ Construction Manager is to perform the Work as shown and noted in the drawings, specifications and schedules for divisions accompanying these documents.
- 1.3 The Contractor/ Construction Manager is to conform to all rules and regulations as directed by the Landlord and outlined in the Base Building Manual and/or Guidelines. The Landlord shall approve all subcontractors/trades selected by the Contractor/ Construction Manager.

2. Project Coordination

- 2.1 Coordinate progress of work, schedules, submittals, use of site, temporary utilities construction, facilities and with work of other related Contractor/ Construction Managers, consultants and suppliers as required under the documents in order to complete the Work.
- 2.2 Drawings are intended to convey scope of work only, and to indicate general and approximate locations, sizes and arrangements of items and equipment. The Contractor/ Construction Manager shall review the site, examine all drawings including pertinent architectural, mechanical, and electrical documentation and become familiar with conditions and spaces affecting these matters before proceeding with the Work.
- 2.3 Coordinate with Landlord as required to complete the Work. Maintain all base building/Landlord guarantees and warranties.
- 2.4 The Contractor/ Construction Manager shall ensure and be responsible that all subcontractors and suppliers read and comply with all documentation forming the Contract.
- 2.5 Provide all materials, forms templates, anchors, sleeves, inserts, templates and accessories as required to be fixed or inserted into the Work.
- 2.6 Arrange regular and extra site meetings when necessary with the Consultant to include parties concerned with progress of the project. If the Project Manager deems that site meetings are unnecessary, Contractor/ Construction Manager to provide weekly status updates to the Project Manager, including photo's showing the progress of work.
- 2.7 If the Tenant occupies the premises or parts thereof, after Substantial Performance but before Total Performance, the Contractor/ Construction Manager shall not be entitled to cost recovery for interference with the performance of Work.

3. Cutting and Patching

- 3.1 Approvals:
Submit written request in advance to Landlord or lawful agent and confirm with Consultant of any cutting or alteration which affects:
- .1 Structural integrity of any element of Project.
 - .2 Efficiency, maintenance, or safety of any operational element.
 - .3 Visual qualities of sight-exposed elements.
 - .4 Work of Owner or separate Contractor/ Construction Manager.
 - .5 Fireproofing of Base Building.
 - .6 Base Building Rules and Regulations.

- 3.2 Inspection:
- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
 - .2 After uncovering, inspect conditions affecting performance of work.
 - .3 Beginning of cutting or patching means acceptance of existing conditions.
 - .4 Coordinate with Landlord as required.
- 3.3 Execution:
- .1 Perform cutting, fitting, and patching to complete the Work.
 - .2 Remove and replace defective and non-conforming work.
 - .3 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical work.
 - .4 Perform work to avoid damage to other work.
 - .5 Prepare proper surfaces to receive patching and finishing.
 - .6 Cut rigid materials using power saw or core drill or as approved by Landlord.
 - .7 Restore work with new products in accordance with Contract Documents.
 - .8 Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
 - .9 At penetration of fire-rated wall, ceiling, or floor construction, completely seal voids with fire-rated material, full thickness of construction element. Submit sample of proposed material for approval prior to use, in accordance with Section 01 78 10. The Contractor/ Construction Manager shall maintain all rated separations in accordance with applicable codes.
 - .10 Refinish surfaces to match adjacent finishes; for continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.
 - .11 Any damage to existing fireproofing to Base Building is to be corrected to match original. Verify type of fireproofing used.
 - .12 Contractor/ Construction Manager shall obtain prior approval for any and all core drilling from the Landlord and Project Manager. Contractor/ Construction Manager is responsible to provide x-rays of floor slab for inspection by the Landlord and his/her/their consultants before work is to proceed.
 - .13 All concrete core drilling is at the Contractor/ Construction Manager's risk with respect to repair of any power or telephone conduit that may be cut, and with respect to third party claims that may result from services interruptions.
4. **Submittals**
Refer to Section 01 78 10
5. **Quality Control**
Refer to Section 01 40 00
6. **Material and Equipment**
Refer to Section 01 60 10
7. **Contract Close-out**
Refer to Section 01 70 00
- Systems Demonstration
- .1 Prior to final inspection demonstrate operation of each system to Owner and provide Owner with operation and maintenance manuals prior to Total Performance.
 - .2 Instruct personnel in operation, adjustment, and maintenance of equipment and systems, using provided operation and maintenance data as basis for instruction prior to Total Performance.
8. **Substitutions**
- 8.1 Substitutions will not be accepted for this project, unless reviewed and approved by the designer prior to ordering.

END OF SECTION

PART 1 GENERAL**1. Contract Reference**

- 1.1 The Standard Construction Document - CCDC2-2020, Supplementary Conditions and all Articles of this Division 1 shall be part of all Sections of these Specifications.
- 1.2 Ensure that all Subcontractors and suppliers carefully read and study the CCDC-2, Supplementary Conditions and Division 1 before commencing their respective work. Delay and/or extra expense will not be accepted by reason of non-compliance with this requirement.

2. Scope and Subdivisions of Work

- 2.1 Mention in the Specifications or indication on the Drawings of materials, products, operations, or methods, requires that the Contractor/ Construction Manager provide each item mentioned or indicated of the quality or subject to the qualifications noted; perform according to the conditions stated each operation prescribed; and provide all labour, materials, products, equipment and services to complete the work.
- 2.2 The Specifications have generally been divided into trade division and the trade divisions into Sections for the purpose of ready reference, but a Section may consist of the work of more than one trade subcontractor or supplier. The responsibility for determining which subcontractor or supplier shall provide labour, material, products, equipment and services to complete the work rests solely with the Contractor/ Construction Manager.

3. Work Provided by Owner or Performed Under Separate Contracts

- 3.1 The term "NIC" shall be construed to mean that work of this Project that is not being performed or provided by the Contract; the term shall mean "Not in This Contract" or "Not a Part of the Work to be performed or provided by the Contractor/ Construction Manager".
- 3.2 "NIC" Work is indicated on the Drawings and specified herein as an aid to the Contractor/ Construction Manager in scheduling the amount of time and materials necessary for the completion of the contract.

4. Discrepancies Omissions

- 4.1 If the Contractor/ Construction Manager finds discrepancies in, or omissions from the Drawings, Specifications or other Contract Documents or has any doubts as to the meaning or intent of any part thereof the Consultant shall be notified at once. The Consultant will send written instructions or explanations. Neither the Owner nor the Consultant will be responsible for oral instructions.

5. Examination

- 5.1 Make a careful examination of site of the project, and investigate and be satisfied as to all matters relating to nature of work to be undertaken, as to means of access and egress thereto and there from, as to obstacles to be met with, as to rights and interests which may be interfered with during construction of the work, as to extent of the work to be performed and any and all matters which are referred to in the Drawings, Specifications and other Contract Documents, or which are necessary for full and proper understanding of the work and conditions under which it will be performed.
- 5.2 No allowances shall be made subsequently in this connection on behalf of the Contractor/ Construction Manager for any error or negligence on its part.
- 5.3 Before commencing the work of any Section, the work of other Sections upon which it may depend, shall be carefully examined. Report any defects, which might affect the new work in writing to the Consultant. Commencement of new work shall imply acceptance of all work by other Sections upon which the new work depends.

6. Defects

- 6.1 Defective material or workmanship whenever found at any time prior to the final acceptance of the work will be rejected regardless of previous inspection. Inspection by the Consultant will not relieve the Contractor/ Construction Manager from responsibility, but it is a precaution against oversight or error. Defective materials shall be removed and replaced by the Contractor/ Construction Manager at his/her/their own expense and he/she/they shall also be responsible for all unnecessary delays and expenses caused by rejection.

7. Dimensions, Clearances & Furring

- 7.1 Check all dimensions at the site before fabrication and installation commences and report all discrepancies to the Consultant.
- 7.2 Where dimensions are not available before fabrication commences, the dimensions required shall be agreed upon between the Sections concerned.
- 7.3 Wall thicknesses shown on the Drawings are nominal only, and actual sizes shall be in all cases ascertained at the building.
- 7.4 Verify dimensions of shop fabricated portions of the work on the site before shop drawings and fabrications are commenced.
- 7.5 The Owner will not accept claims for extra expense on the part of the Contractor/ Construction Manager by reason of non-compliance with this clause.
- 7.6 In areas where equipment will be installed, check dimensional data on equipment to ensure that the area and equipment dimensions are compatible with the necessary access and clearance provided. All equipment supplied shall be dimensionally suitable for space provided.
- 7.7 The mechanical and electrical drawings are intended to show approximate locations of mechanical and electrical apparatus, mechanical fixtures, mechanical equipment, piping and duct runs, electrical fixtures, electrical outlets, electrical equipment, electrical units, and conduit in diagrammatic form and are not dimensioned, their locations shall be considered approximate. Check the interior design drawings and consult with the Consultant to settle the actual locations of these items as may be required to suit aesthetic and job conditions. Such relocation shall be done without charge to the Owner.
- 7.8 Leave areas clear when space is reserved for future equipment, including access to such future equipment.
- 7.9 Whether shown on the drawings or not, leave adequate space for and provision for servicing of equipment and removal and reinstallation of replaceable items such as motors, coils, and tubes.
- 7.10 Furr in all exposed pipes (new and existing) located not more than 12" (300 mm) from the wall (exception - storage rooms, janitor, service, mechanical and electrical, telephone and garage) and/or ceiling surfaces and finishes similar to the respective wall and/or ceiling surfaces, unless otherwise noted.
- 7.11 Pipes, service lines and ducts (new and existing), shall be concealed in chases, behind furring, or above ceiling except where such items are noted as being exposed, and except where no ceiling is provided.
- 7.12 Install equipment, materials and products to present a neat appearance. Run piping, ducts, and conduit parallel to or perpendicular to the building planes.
- 7.13 Install all ceiling mounted components including, but not limited to, air terminals, sprinkler heads, and lighting fixtures in strict accordance with final ceiling plans.

8. Cooperation and Coordination

- 8.1 All Sections shall cooperate with each other, to ensure that the work will be carried out expeditiously and that it will be satisfactory in all respects at completion.
- 8.2 All trades shall examine the Drawings and Specifications covering the work of all other Sections which may affect the performance of his/her/their own work, examine the work of other trades at the building, and report to the Consultant any defects or deficiencies which may adversely affect the work. In the absence of such a report, the Contractor/ Construction Manager shall be held to have waived all claims for damage to or defects in such work.
- 8.3 All trades shall cooperate with other trades whose work attaches to or is affected by their own work, and ensure minor adjustments are made to make adjustable work fit fixed work.
- 8.4 Trades requiring foundations, supports or openings to be left for the installation of their work shall furnish the necessary information to the sections concerned in ample time so that proper provision can be made for such items. Failure to comply with this requirement shall not relieve the trade at fault of the cost of cutting, drilling, etc., at a later period, and the subsequent patching of other work required.
- 8.5 Supply all items to be built-in (including anchors, ties, dovetail slots, nailing strips, blocks, bolts, sleeves, etc.) foundations and openings, when required by the trades concerned together with templates, measurements and shop drawings. The responsible trade shall pay for any necessary cutting, fixing, and make good the work of other trades for failure to comply with this requirement.
- 8.6 Coordinate the Work of this Contract with the Landlord and any other Contractor/ Construction Manager the Owner may designate for any part of the work, including but not limited to, communications and security cabling Contractor/ Construction Managers, furniture installers, equipment suppliers, etc.
- 8.7 Where the Work of this Contract involves changes, revisions or connections to the Base Building mechanical, electrical, sprinkler or structural, and the changes, revisions, or connections hereto would adversely affect the Landlord's guarantees or warranties, the Landlord Base Building's Contractor/ Construction Manager will specify the method in which such item or work shall be done so as not to void the guarantee or warranty. The Contractor/ Construction Manager shall strictly follow such method or be responsible for any loss or damage suffered by the Landlord.
- 8.8 Openings left in concrete for other subcontractors and trades shall be made good by the trade that made the opening.

9. Services Priority

- 9.1 In the event of interference occurring between equipment shown in a concealed area, the following order of priority shall be observed:

Structural Elements Plumbing Drains Sprinkler Piping Duct Work
Heating Piping Plumbing Piping Electrical Conduit

10. Workmanship

- 10.1 The work of all Sections shall be fabricated and installed in accordance with the best practice by craftsmen skilled in the work of the respective Section. Unless otherwise specified, the manufacturer's latest printed instructions shall be rigidly complied with in the methods and materials to be used in the installation of the work. The Consultant shall be notified in writing if these Specifications and/or Drawings conflict in any way with manufacturer's instructions. The Consultant will then rule which specifications shall be followed. If applicable, a copy of those instructions shall be made available at the job site.

11. Protection

- 11.1 Adequately protect the work at all stages of the operations and maintain the protection until work is completed. Remove and replace any work and materials damaged that cannot be repaired or restored to the Consultant's approval.
- 11.2 The Owner assumes no responsibility for safeguarding of tools or equipment from theft.
- 11.3 All public areas that are affected by construction under this Contract shall be protected at all times. Should any damage occur, it shall be repaired immediately at the expense of the Contractor/ Construction Manager.

12. Overloading

- 12.1 Do not overload any part of the structure during the construction with a load greater than it is calculated to bear safely when complete. The Contractor/ Construction Manager shall be held solely responsible and liable for any damage resulting from violation of this requirement. Temporary support shall be as strong as the permanent support. Do not load concrete floors until they have obtained their design strength.
- 12.2 Do not cut, bore or sleeve load-bearing members without written approval of the Project Manager and Landlord.

13.1 Construction Safety

- 13.1 Observe and enforce all construction safety measurements, as contained in the requirements of Provincial Government and local Municipal Statutes and Authorities.
- 13.2 In the event of conflict between any of the provisions of Municipal By-laws, the Provincial Acts and the Canadian Construction Safety code, the most stringent provisions shall apply.

14. Emergency Contact

- 14.1 The Contractor/ Construction Manager shall post at the site at least two names and telephone numbers for emergency contact.

15. Fastenings

- 15.1 Supply fastenings, anchors and accessories as required for fabrication and erection of this work.
- 15.2 Exposed metal fastenings and accessories shall be of the same texture, colour and finish as the base metal on which they occur.
- 15.3 Metal fastenings shall be of the same materials as the metal component they are anchoring.
- 15.4 In general, exterior anchors for windows, roofing, sheet metal, and anchors occurring on or in an exterior wall or slab shall be non-corrosive or hot-dip galvanized steel. Prime paint shall not be considered suitable protection against corrosion.
- 15.5 Fastenings shall be of such a type and size and installed in such a manner to provide positive permanent anchorage of the unit to be anchored in position. Anchors shall be installed at spacing required to provide load-bearing capacity.
- 15.6 Keep exposed fastenings to a minimum, evenly spaced and neatly laid out, unless otherwise specified.
- 15.7 Provide adequate instructions and/or templates and, if necessary, supervise the installation where fastenings and accessories are required to be built into work of other trades.
- 15.8 Fastenings shall be a permanent type. Wood plugs will not be permitted.
- 15.9 Fastenings which cause spalling or cracking of material to which anchorage is being made will not be permitted.

- 15.10 Do not use powder-activated fastenings on any portion of the work unless written approval for a specific use is obtained from the Consultant. Only tools of low velocity, double guidance types are acceptable.
- 15.11 Only "caddy clips" and double-sided tape shall be used to anchor partitions to Base Building Ceiling grid or radiation units (no screwing into T-bar will be permitted).
- 15.12 Fastening to ceilings for suspended material shall be in conformance with O.B.C.
- 15.13 No drilling of holes into curtain wall members, T-bars, or convection unit covers is permitted.
- 15.14 The Contractor/ Construction Manager is not permitted to drill cut or chase openings of any description in any part of the building structure. Where the Landlord deems such work necessary and acceptable, it shall be carried out under the Landlord's supervision and only after x-ray inspection of concrete slab prior to drilling or cutting, at the Contractor/ Construction Manager's expense.
- 15.15 Maintain structural integrity of ceiling system regardless of any changes.
- 16. Owner's Right to Relocate Doors and/or Partitions**
- 16.1 The Owner reserves the right to relocate doors and frames and/or partitions at a later date, but prior to installation, without cost, assuming that there will be no increase in the number of doors and/or frames, or greater lengths or heights of partitions, or no increase in number of corners.
- 16.2 Should there be an increase or decrease in doors, frames or lengths of partitions after such relocation, adjustments in costs shall be made.
- 17. Owner's Right to Relocate Mechanical/Electrical Items**
- 17.1 The Owner reserves the right to relocate electrical outlets at a later date, but prior to installation, without cost, assuming that the relocation per outlet does not exceed 10'-0" (3000 mm) from the original location. No credit shall be anticipated where relocation per outlet of up to 10'-0" (3000 mm) reduces materials, products, and labour.
- 17.2 Make necessary changes, due to lack of coordination, and as required when approved, at no additional cost, to accommodate structural and building conditions. The location of pipes and other equipment shall be altered without charge to the Owner, if approved, provided the change is made before installation.
- 18. Codes and Standards**
- 18.1 All contract forms, codes, specifications, standards, manuals, and installation, application and maintenance instructions, referred to in these Specifications shall be of the latest published editions at the date of submission of the Tender unless otherwise stated in the Specifications or not acceptable to the authorities having jurisdiction. In the case of conflict or discrepancy, the more stringent requirement shall apply.
- 18.2 The purpose of specifying standard reference specifications is to establish minimum acceptable standards of materials and workmanship. Materials and workmanship shall meet or exceed requirements of the reference standards specified.
- 18.3 Where a material or product is specified in conjunction with a referenced standard, do not supply the material or product if it does not meet the requirements of the standard. Supply another specified material or product, or acceptable material or product of another approved manufacturer that does meet the standard, at no additional cost to the Owner.
- 18.4 Where no standard is referred to, materials or workmanship shall meet requirements of the applicable standards of the Canadian Standards Association, Canadian Government Specifications Board or the National Building Code of Canada.

- 18.5 Where a material or product is required to conform to a standard such as CSA, ASTM, ULC, ULI, CGSB, NBC, etc., supply to the Consultant, on request, satisfactory evidence that the material or product complies with the standard specification or test requirements.
- 19. Fire Ratings**
- 19.1 Where specifications require a material, component or assembly to be fire related, the fire rating shall be as determined or listed by one of the following testing authorities if approved by Authorities having jurisdiction:
- Underwriters' Laboratories of Canada Underwriters' Laboratories Inc. (U.S.A.) Factory Mutual Laboratories
 - The National Building Code of Canada The National Board of Fire Underwriters The Ontario Building Code
 - The Ontario Fire Code
- 19.2 Where reference is made to only one testing authority, an equivalent fire rating as determined or listed by another of the aforementioned authorities is acceptable if approved by Authorities having jurisdiction.
- 20. Documents**
- 20.1 Maintain one copy of each of the following on the job site:
- Contract drawings Specifications Addenda
 - Reviewed shop drawings Change orders
 - Test reports
 - Approved work schedule
 - Manufacturer's installation and application instructions
- 21. By-laws and Regulations**
- 21.1 Nothing contained in the Drawings and Specifications shall be so construed as to be in conflict with any law, by-law or regulation of the municipal, provincial or other authorities having jurisdiction. Work shall be performed in conformity with all such laws, by-laws and regulations.
- 22. Fair Wages**
- 22.1 Wherever possible, the Contractor/ Construction Manager shall give preference to the use of local labour, building mechanics, suppliers, and subtrades. Rates of wages, hours and conditions of work of persons employed on the work shall be in accordance with provincial codes and as generally accepted and recognized in the locality.
- 23. Trademarks and Labels**
- 23.1 Trademarks & Labels shall be verified by the appropriate consultant prior to their removal.
- 23.2 Trademarks and labels, including applied labels shall not be visible in the finished work. Such trademarks or labels shall be removed by grinding if necessary, or painted out where the particular material has been painted. (Exception Refer to 23.3).
- 23.3 Trademarks and labels shall not be removed when identification of mechanical and electrical equipment, fire ratings, etc. are required to be visible for authorities having jurisdiction and maintenance.

24. Work Force Affiliations

24.1 The Contractor/ Construction Manager is free to select any subcontractor compatible with his work force affiliations. Likewise, the Owner is free to select Contractor/ Construction Managers with either union or non-union affiliation to complete/perform work outside this contract. Any labour unrest resulting from the work force selection will be the responsibility of the Contractor/ Construction Manager to immediately resolve.

25. Clean-Up

25.1 The Contractor/ Construction Manager shall maintain the work in a tidy condition and free from the accumulation of waste products and debris, other than that caused by the Owner, other Contractor/ Construction Managers or their employees.

25.2 Each trade shall clean and make good, to the Consultant's approval, surfaces soiled or otherwise damaged in connection with the work of his trade. The Contractor/ Construction Manager shall pay cost of replacing fixtures or materials that cannot be satisfactorily cleaned.

25.3 Each trade shall upon completion of his daily work, remove all debris, equipment and excess material resulting from the work of his Section, from the site.

25.4 Burning of rubbish on the site will not be permitted.

25.5 Do not dispose of waste or volatile materials such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

26. Access

26.1 The Contractor/ Construction Manager shall make arrangements with the Landlord for access and delivery of materials to the site.

26.2 The Landlord shall have free access to the leased premises at all times for the purpose of completing, correcting or inspection of any work.

27. Security

27.1 Comply with Landlord's security requirements. No access into the building from swing stages and scaffolding will be permitted without Landlord's approval.

28. Work Conflict

28.1 The Contractor/ Construction Manager and his Subcontractor shall perform their work in a manner that shall not interfere or conflict with any activities of the Landlord, Owner or other tenants or the operations of the building.

29. Access Panels

29.1 Provide access panels in new or existing walls, ceilings and floor construction as approved by the Landlord, Project Manager and Consultants to permit necessary access to equipment or services which require it.

29.2 Provide access panels in locations where they currently exist, which were removed because of new construction. Partitions, which cross induction units, shall allow for removal of panels for access to valves.

29.3 Prepare a layout of all access panels, which shall be required, for review and approval by Landlord, Project Manager and Designer showing exact sizes and locations of access panels.

29.4 Access panels shall be finished to match adjacent floor, wall and/or ceiling finish unless otherwise specified or indicated.

30. Noise Control

30.1 Comply with the requirements of Authorities having jurisdiction and noise control by-laws to ensure noise generated by the work is not excessive and not disturbing to the Public and the Owners and users of adjacent buildings.

31. Testing and Mix Designs

31.1 Arrange for tests as required to establish design parameters, to verify characteristics or quality of products and materials, and any other tests, which the Consultant may reasonably require. The Contractor/ Construction Manager will pay for such tests. The Consultant will appoint independent testing agencies or facilities, which may be required to effectively carry-out such tests.

31.2 Cooperate with independent testing agencies while they are performing above tests.

END OF SECTION

PART 1 GENERAL**1. Intent of Section**

- 1.1 The intent of this project is to build a workplace that represents positive environmental initiatives. The Contractor is encouraged to offer additional solutions with cost effective strategies as part of the build-out. This section outlines the Contractors'/ Construction Manager's responsibilities for the construction of this project.

2. Demolition

- 2.1 The Contractor/ Construction Manager is to retain any building materials from existing site that may be used in construction of new premises. This shall include, but shall not be limited to, all components of the demountable partition system, gypsum board for re-use above ceiling, plastic laminate and wood doors and code compliant hardware.
- 2.2 Where applicable, all demolition garbage shall be sorted and taken to appropriate facilities for recycling.
- 2.3 Existing carpet shall be vacuumed prior to removal and floor shall be vacuumed after carpet removal.
- 2.4 Allow for proper ventilation of the premises upon completion of demolition.

3. New Construction - General

- 3.1 All new construction shall be done with environmental principles as first consideration. Products with little or no Volatile Organic Compound emissions must be used as available. Materials should be sourced locally, if possible, and preference be given to materials from a renewable resource.
- 3.2 All methods and materials shall be installed as to encourage future reclamation and re-use.

4. New Flooring

- 4.1 Ensure new carpet has minimum one week to off-gas prior to being installed. This shall be done at the installer's warehouse by means of unrolling the new carpet. The Project Manager shall have access to verify unrolled product one week prior to installation.
- 4.2 Upon installation of carpet, the HVAC fans shall be engaged continuously for 48 with a minimum efficiency MERV 8 filter at each return air grill hours to allow for ventilation of the premises.
- 4.3 For glue down carpet, use low VOC adhesive, such as Robert's Earthbound 7000 or equivalent from Chembond. Follow the installation guidelines CR1-105 of the Carpet and Rug Institute, which must be compliant with manufacturer's installation instructions to maintain warranties.

5. New Wall Finishes

- 5.1 Use low VOC latex-based paint, which contains little or no solvents, and with maximum VOC 5g/litre or less.
- 5.2 Vinyl wallcovering (if applicable) shall be applied with a low VOC latex adhesive.

6. Doors

- 6.1 Refer to Door Schedule and if existing doors comply with specifications, then wherever possible, re-use existing doors and re-tool, as required, to suit new locations. Contractor shall submit a list of re-usable doors.
- 6.2 Refer to Hardware Schedule and if existing hardware complies with specifications, then wherever possible re-use existing hardware and match any new hardware to existing.

END OF SECTION

1 GENERAL

1.1 APPROVED ALTERNATES AND APPROVED EQUIVALENT

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

1.2 SUBSTITUTIONS

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

2 PRODUCTS

2.1 NOT USED

.1 Not Used

3 EXECUTION

3.1 NOT USED

.1 Not Used

END OF SECTION

1 GENERAL**1.1 DESCRIPTION**

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

1.2 RELATED MECHANICAL AND ELECTRICAL WORK

- .1 Coordination of the installation of systems specified 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 co-ordination of subtrade work. No extras will be considered for work not properly coordinated prior to installation.
- .3 Ensure that service poles, pipes, conduit, wires, fill-pipes, vents, regulators, meters and similar Project service work is located in inconspicuous locations. If not indicated on Drawings, verify location of service work with Consultant before commencing installation.

1.3 QUALITY ASSURANCE

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

1.4 SUPERINTENDENCE

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

- .4 Arrange for sufficient number of qualified assistants to the supervisor as required for the proper and efficient execution of the Work.

1.5 SUBMITTALS

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

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

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

1.7 JOB CONDITIONS

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

1.8 WARRANTIES

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

1.9 CO-ORDINATION

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

1.10 COOPERATION

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

1.11 STRUCTURE ALIGNMENT REPORTS

- .1 Have a qualified instrument technician check alignment of perimeter slab edge, and alignment of concrete cores as work progresses.
- .2 Check alignment at each floor and submit a written report, under signature of instrument technician and Contractor, stating conditions at that floor, prior to concrete pour of next floor.
- .3 State in reports variations from plumb, from horizontal alignment, and from elevations (level) shown in Contract Documents. Report on variations affecting structural steel connections and connections of components in building envelope.
- .4 Include a listing of data submitted in previous reports.
- .5 Make particular mention in each report to alignment and dimensions of elevator hoist ways, and to exterior faces of core wall construction which will provide substrate for applied finishes in public areas.
- .6 Correct deviations from allowable tolerances as directed by Consultant
- .7 Submit reports to Consultant and to Subcontractors affected by concrete work, including but not limited to Subcontractors for following trades as applicable, structural steel, architectural precast concrete cladding, curtain wall, elevator, plastering and/or gypsum board.

1.12 INTERFERENCE DRAWINGS

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

- .6 Be responsible for preparation of interference Drawings and coordinate. Obtain input from all Subcontractors. Assign mechanical and electrical coordinator to lead process of interference Drawings.

1.13 PROJECT RECORD DRAWINGS

- .1 Record, as the work progresses, work constructed differently than shown on Contract Documents. Record all changes in the work caused by site conditions; by Owner, Consultant, sub-consultants, Contractor, and Subcontractor originated changes; and by site instructions, supplementary instructions, field orders, change orders, addendums, correspondence, and directions of authorities having jurisdiction. Accurately record location of concealed structure, and mechanical and electrical services, piping, valves, conduits, pull boxes, junction boxes and similar work not clearly in view, the position of which is required for maintenance, alteration work, and future additions. Do not conceal critical work until its location has been recorded.
- .2 Dimension location of concealed work in reference to building walls, and elevation in reference to floor elevation. Indicate at which point dimension is taken to concealed work. Dimension all terminations and offsets of runs of concealed work.
- .3 Make records in a neat and legibly printed manner with a non-smudging medium.
- .4 Identify each record drawing as "Project Record Copy". Maintain drawings in good condition and do not use them for construction purposes.
- .5 After completion of the work, purchase a complete set of white prints from the Consultant and transfer the information recorded on the white prints accurately, neatly in red ink with dimensions, as applicable. Return these marked-up as-built white prints plus two additional sets of white prints to the Consultant for his/her/their review. Any subsequent changes found by the Consultant shall remain the responsibility of the contractor and new white prints will be issued for these changes and re-submitted back to the Consultant at no charge to the Owner.
- .6 Maintain Project record drawings in a state current to Project. Such state will be considered a condition precedent for validation of applications for payment. The Consultant's visual inspection will constitute proof that record drawings are current.
- .7 Provide Consultant with accurate red-marked record drawings for their transfer to latest version of AutoCad with application for Certificate of Substantial Performance. Final acceptance of the Work will be predicated on receipt and approval of record drawings.

1.14 DETAIL FINISHING DRAWINGS

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

1.15 CUTTING AND PATCHING

- .1 Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - .1 Cut in-place 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 Before cutting, drilling, or sleeve of structural load-bearing elements, obtain approval of location and methods from the Structural Engineer and the General Contractor.
- .2 Provide temporary support of work to be cut.

- .3 Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- .4 Cut and drill with true smooth edges and to minimum suitable tolerances.
- .5 Fit construction tightly to ducts, pipes and conduits to stop air movement completely. The Section performing work that penetrates a fire, air, vapour, moisture, thermal or acoustic separation of the building shall pack voids tightly with rock wool, fibreglass or fire stop material as may be required; seal air, vapour and moisture barriers; and caulk joints as may be required to ensure that no air movement through the penetration is possible.
- .6 Cutting, drilling and sleeve of work shall be done only by the Section who has installed it. The Section requiring drilling and sleeve shall inform the Section performing the work of the location and other requirements for drilling and sleeve.
- .7 Replace, and otherwise make good, all damaged work, as identified by the Consultant or Contractor.
- .8 Cutting and Patching for Holes Required by Mechanical and Electrical work:
 - .1 Include under work of the Mechanical and Electrical Engineer, cutting or provision of holes up to and including 50 square inches and related patching, except as otherwise indicated.
 - .2 Include under work of this Division holes and other openings larger than 50 square inches, and chases, bulkheads, furring and required patching. This Section shall be responsible for determination of work required for holes in excess of 50 square inches.
- .9 This Section shall be responsible for all cutting and patching in addition to that specified for mechanical and electrical work, and shall directly supervise performance of cutting and patching by other Sections.
- .10 Patching or replacement of damaged work shall be done by the Subcontractor under whose work it was originally executed, and at the expense of the Subcontractor who caused the damage.
- .11 Make patches as invisible as possible in final assembly to the approval of the Consultant/Owner. Unacceptable work will be replaced at no charge to the Owner.

2 PRODUCTS

2.1 NOT USED

- .1 Not Used

3 EXECUTION

3.1 NOT USED

- .1 Not Used

END OF SECTION

1 GENERAL**1.1 ADMINISTRATIVE**

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

1.2 CONTRACT START-UP MEETING

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

- .19 Workplace Safety and Insurance Board Certificate.
- .4 The Consultant shall organize and chair the contract start-up meeting. Consultant shall record minutes of the contract start-up meeting and distribute a copy to each participant within ten (10) days of meeting.

1.3 PRE-INSTALLATION MEETINGS

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

1.4 PROGRESS MEETINGS

- .1 During the course of the Work prior to Substantial Performance of the Work, schedule progress meetings as directed by the Consultant.
- .2 In advance of progress meetings, Contractor shall submit to the Consultant a two week look ahead schedule of items of work to be undertaken in the two weeks subsequent to the progress meeting. Two (2) week look ahead schedule will be reviewed at the meeting and recorded in the minutes of the meeting. Refer to Section 01 32 16 for requirements for look ahead schedule.
- .3 Attendees at progress meetings shall include the following:
 - .1 Contractor.
 - .2 Contractor's site superintendent(s).
 - .3 Consultant.
 - .4 Owner.

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

1.5 PRE-TAKEOVER MEETING

- .1 Prior to application for Substantial Performance of the Work, schedule a pre-takeover meeting.
- .2 Agenda to include the following:
 - .1 Review, approval of proceedings of previous meeting.
 - .2 Review of items arising from proceedings.
 - .3 Review of procedures for Substantial Performance of the Work, completion of the Contract, and handover of the Work.
 - .4 Field observations, problems, conflicts.
 - .5 Review of outstanding Contract modifications and interpretations including, but not limited to: requests for interpretation and log, proposed Change Orders, Change Orders, Change Directives, Supplemental Instructions, for effect on construction schedule and on Contract Time.
 - .6 Problems which impede Substantial Performance of the Work.
 - .7 Review of procedures for deficiency review. Corrective measures required.
 - .8 Progress, schedule, during succeeding period of the Work.
 - .9 Review submittal requirements for warranties, manuals, and all demonstrations and documentation required for Substantial Performance of the Work.
 - .10 Review of status of as-built documents and record drawings.
 - .11 Other business.

1.6 POST-CONSTRUCTION MEETING

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

2 PRODUCTS**2.1 NOT USED**

- .1 Not Used

3 EXECUTION**3.1 NOT USED**

- .1 Not Used

END OF SECTION

1 GENERAL

1.1 PLANNING, SCHEDULING AND MONITORING – GENERAL

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

1.2 CPM SCHEDULING REQUIREMENTS

- .1 The schedules required by this section shall take the form of time-scaled diagrams prepared using a computerized scheduling system, capable of producing resource-and/or cost-loaded Critical Path Method (CPM) schedules.
- .2 General requirements applicable to all schedules include the ability to:
 - .1 Easily summarize, group, sort and filter activities by area, phase or other categorization as applicable, or any combination thereof;
 - .2 Electronically compare any given schedule with any previous or subsequent update;
 - .3 Generate monthly progress claims and cash flow projections through resource and cost loading activities;
 - .4 Show schedules in bar chart, network diagram and time scaled logic diagram formats;
 - .5 Apply different calendars to applicable activities; and
 - .6 Transmit schedules electronically via e-mail attachments.
- .3 Provide level of detail for project activities such that sequence and interdependency of Contract tasks are demonstrated and allow coordination and control of project activities. Show continuous flow from left to right.
- .4 Float is defined as the amount of time between the earliest start date and the latest start date of an activity or chain of activities on the CPM schedule. Ensure activities with no float are calculated and clearly indicated on logical CPM construction network system as being, whenever possible, continuous series of activities throughout Contract Time to form "Critical Path".
- .5 Use of float suppression techniques such as software constraints, preferential sequencing, special lead/lag logic restraints, extended activity times, or imposed dates, other than as required by the Contract, shall be cause for the rejection of any schedule submitted by the Contractor.

1.3 SUBMITTALS

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

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

1.4 QUALITY ASSURANCE

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

1.5 PRELIMINARY AS-PLANNED SCHEDULE

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

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

1.6 PRELIMINARY AS-PLANNED SCHEDULE SUBMISSION AND REVIEW

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

1.7 FINAL AS-PLANNED SCHEDULE AND CASH FLOW

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

1.8 FINAL AS-PLANNED SCHEDULE SUBMISSION, REVIEW AND APPROVAL

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

- .3 Consider final as-planned schedule showing Work completed in less than specified Contract duration, to have float.

1.9 COMPLIANCE WITH CONTRACT SCHEDULE

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

1.10 PROGRESS MONITORING

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

1.11 UPDATES AND REVISIONS TO SCHEDULE

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

- .6 If, at any time, the work is behind schedule with respect to the progress schedule currently in force, and if the Consultant believes there is a risk of the Work not being completed within the Contract Time as a result of such delay, the Contractor shall take all necessary measures to make up for such delay either by increasing staff, plant or facilities, or by amending its work methods, whichever is applicable.
- .7 In all cases of delay or potential delay, the Contractor shall keep the Owner and the Consultant informed of its intentions with regard to mitigation of such delay and the Owner's Consultant may, if it is deemed necessary, require the Contractor to revise all or part of its current progress schedule.
- .8 The current Contract Schedule can only be revised as agreed with the Owner and the Consultant by Change Order or an accepted revision to the logical sequence of described construction operations.
- .9 Once accepted, the revised schedule will become the current Contract Schedule against which progress is reported and to which subsequent updates will be compared. The new Contract Schedule will be clearly identified to show it as the current Contract Schedule.
- .10 Where the progress schedule shows completion of the Contract, or of any interim milestone, later than the Contract or milestone completion dates, acceptance of such progress schedules and of the monthly progress report will not constitute acceptance of the delay by the Consultant or the Owner.

1.12 EXTENSIONS OF TIME

- .1 Float shall not be for the exclusive use of either the Contractor or the Owner. Extensions to the Contract Time will be granted only to the extent that appropriate adjustments to the duration of the affected activity exceed the total float time along the affected paths of the progress schedule in force at the time a Change Order or Change Directive is issued.
- .2 Submit to the Consultant, justification, project schedule data and supporting evidence for approval of extension to the Contract Time or interim milestone date when required. Include as part of supporting evidence:
 - .1 Written submission of proof of delay based on revised activity logic, duration and costs, showing time impact analysis illustrating influence of each change or delay relative to approved Contract Schedule.
 - .2 Prepared schedule indicating how change will be incorporated into the overall logic diagram. Demonstrate perceived impact based on date of occurrence of change and include status of construction at that time.
 - .3 Other supporting evidence requested by the Consultant.

1.13 PROGRESS REPORTS

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

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

1.14 REVIEW OF MONTHLY PROGRESS REPORTS

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

2 PRODUCTS**2.1 NOT USED**

- .1 Not Used

3 EXECUTION**3.1 NOT USED**

- .1 Not Used

END OF SECTION

1 GENERAL**1.1 GENERAL**

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

- .5 Make submittals with reasonable promptness and in an orderly sequence so as to cause no delay in the Work. Be responsible for delays, make up time lost and pay added costs, at no additional cost to the Owner, incurred because of not making submittals in due time to permit proper review by Consultant.
- .6 Submittals that contain substitutions will be rejected. Substitutions are permitted only on substitution submittals as specified in Section 01 25 13.
- .7 Do not proceed with work affected by a submittal, including ordering of Products, until relevant submittal has been reviewed by Consultant.
- .8 Prepare submittals using imperial units.
- .9 Contractor's responsibility for errors and omissions in submittals is not relieved by Consultant's review of submittals.
- .10 Contractor's responsibility for deviations in submittal from requirements of Contract Documents is not relieved by Consultant's review of submittal, unless Consultant gives written acceptance of specific deviations.
- .11 Engineered submittals:
 - .1 Submittals for items required to be sealed by professional engineer (or as otherwise indicated as engineered), shall be prepared under the direct control and supervision of a qualified professional engineer registered in the Place of the Work, and having minimum professional liability insurance required in accordance with the General Conditions, as amended.
 - .2 Design includes life safety, sizing of supports, anchors, framing, connections, spans, and as additionally required to meet or exceed requirements of applicable codes, standards, regulations, and authorities having jurisdiction.
 - .3 Engineered submittals shall include design calculations, complete with references to codes and standards used in such calculations, supporting the proposed design represented by the submittal. Prepare calculations in a clear and comprehensive manner so that they can be easily reviewed. Incomplete or haphazard calculations will be rejected.
 - .4 The professional engineer responsible for the preparation of engineered submittals shall undertake periodic field review, including review of associated mock-ups, at locations wherever the work as described by the engineered submittal is in progress, during fabrication and installation of such work, and shall submit a field review report after each visit. Field review reports shall be submitted to the Consultant, to authorities having jurisdiction as required, and in accordance with the building code.
 - .5 Field reviews shall be at intervals as necessary and appropriate to the progress of the work described by the submittal to allow the engineer to be familiar with the progress and quality of such work and to determine if the work is proceeding in general conformity with the Contract Documents, including reviewed shop drawings and design calculations.
 - .6 Upon completion of the parts of the Work covered by the engineered submittal, the professional engineer responsible for the preparation of the engineered submittal and for undertaking the periodic field reviews described above, shall prepare and submit to the Consultant and authorities having jurisdiction, as required, a letter of general conformity for those parts of the Work, certifying that they have been Provided in accordance with the requirements both of the Contract Documents and of the authorities having jurisdiction over the Place of the Work.
 - .7 Costs for such field reviews and field review reports and letters of general conformity are included in the Contract Price.
- .12 Keep copies of reviewed submittals at the Place of the Work in a neat, orderly condition. Only submittals that have been reviewed by the Consultant's and are marked with Consultant's review stamp, as applicable, are permitted at the Place of the Work.
- .13 The Work shall conform to reviewed submittals subject to the requirements of this section. Remove and replace materials or assemblies not matching reviewed submittals at no increase in the Contract Time and at no additional cost to the Owner.

1.2 SUBMISSION PROCEDURES

- .1 Coordinate each submittal with requirements of the Work and Contract Documents. Individual submittals will not be reviewed until related information is available.
- .2 Distribute copies of submittals to parties whose work is affected by submittals except Consultant and Owner before final submission for review by Consultant.
- .3 Accompany submittals with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each submittal.
 - .5 Other pertinent data.
- .4 Each submittal shall be identified numerically by relevant specification section number with a numeric indicator for multiple submittals by that section followed by revisions number, for example 08 11 13-01-R0.
- .5 Make any changes in submittal that Consultant may require, consistent with Contract Documents, and resubmit as directed by Consultant.
- .6 Notify Consultant, in writing, when resubmitting, of any revisions other than those requested by Consultant.
- .7 After Consultant's review, distribute copies to affected parties.
- .8 Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Construction Manager'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 ten (10) days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Construction Manager will advise Contractor when a submittal being processed must be delayed for coordination.
 - .2 Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 - .3 Resubmittal Review: Allow ten (10) days for review of each resubmittal.
 - .4 Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Consultant, and to Consultant's Sub-consultants, allow ten (10) days for review of each submittal. Submittal will be returned to Construction Manager, through Consultant, before being returned to Contractor.
 - .1 Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Consultant and Construction Manager.
- .9 Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 - .1 Note date and content of previous submittal.
 - .2 Note date and content of revision in label or title block and clearly indicate extent of revision.
 - .3 Resubmit submittals until they are marked with reviewed notation from Consultant's and Construction Manager's action stamp.
- .10 Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

- .11 Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with reviewed notation from Consultant's and Construction Manager's action stamp.

1.3 CONSTRUCTION PROGRESS SCHEDULE

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

1.4 PRODUCT DATA SHEETS

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

1.5 SHOP DRAWINGS

- .1 Submit shop drawings for which submission is required in other Sections of this Specification. Include in final shop drawing submissions detailed information, templates and installation instructions required for incorporation and connection of the work concerned, and other details as may be specified in other Sections.
- .2 In addition to shop drawings specified in other Sections, submit shop drawings required by authorities having jurisdiction in accordance with their requirements.
- .3 The General Contractor shall check, sign, and make notations he/she/they considers necessary on shop drawings before each submission to the Consultants for their review.
- .4 Indicate on each submission changes from the Contract Drawings and Specification that have been incorporated in the shop drawings. The Contractor shall be responsible for changes made from the Contract Drawings and Specification which are not indicated or otherwise communicated in writing with the submission.
- .5 Shop drawing review by Consultant or sub-consultants is for the sole purpose of ascertaining conformance with the general design concept and as a precaution against oversight or error. This review shall not mean that Consultant and sub-consultants approve the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of his/her/their responsibility for errors or omissions in the shop drawings or of his/her/their responsibility for meeting all requirements of the Contract Documents. No review of design

shall be assumed made when such design is a responsibility of the Contractor included in the work. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for coordination of the work of all Subcontractors.

- .6 Show on shop drawings all pertinent information required for materials and installation, and for proper integration of this installation with work of others.
- .7 The shop drawings shall show, but not necessarily be limited to the following:
 - .1 Clear and obvious notes of any proposed changes from Drawings and Specifications.
 - .2 Fabrication and erection dimensions.
 - .3 Provisions for allowable construction tolerances and deflections provided for live loading.
 - .4 Details to indicate construction arrangements of the parts and their connections, and interconnections with other work.
 - .5 Location and type of anchors, and exposed fastenings.
 - .6 Materials and finishes.
 - .7 Descriptive names of equipment.
 - .8 Mechanical and electrical characteristics when applicable.
 - .9 Information to verify that superimposed loads will not affect function, appearance, and safety of the work detailed as well as of interconnected work.
 - .10 Assumed design loadings, and dimensions and material specifications for load bearing members.
 - .11 Dimensions and dimensioned locations of proposed chases, sleeves, cuts and holes in structural members.
- .8 Submit shop drawings folded into 8-1/2" x 11" size with title block appearing on outside. Four (4) copies of engineering data sheets, catalogue cuts and standard diagrams may be substituted for shop drawings where applicable. One (1) reproducible and three (3) white prints of each drawing are required.
- .9 Shop drawings which require extensive correction or are in substantial disagreement with intent of contract documents will be sent back for revisions and resubmission. The reproducible copy will be returned.
- .10 Otherwise, shop drawings will be sent back with review comments only. The reproducible copy and two (2) white prints will be returned. One (1) white print will be retained.
- .11 Conform to review comments and stamped instructions of each shop drawings reviewer.
- .12 Only drawings noted for revision and resubmission need be resubmitted. Include revisions required by previous reviews before resubmission of shop drawings.
- .13 Do not add new details or information to shop drawings after they have been reviewed, unless requested by the reviewer, requiring a re-submission.
- .14 Do not proceed with work dependent on shop drawing information until approval is given and verification received from Contractor. The Contractor shall be responsible for work performed prior to receipt of reviewed shop drawings. No review comments shall be construed as authorization for Changes in the work.
- .15 Fabricate work exactly as shown on shop drawings. If shop practice dictates revisions, revise drawings and resubmit.
- .16 File one (1) copy of each finally revised and corrected shop drawing on site.
- .17 Provide shop drawings as called for in the Trade Sections of these Specifications.

1.6 SAMPLES

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

1.7 MOCK-UPS

- .1 Where required by the Contract Documents or as may reasonably be requested by the Consultant during the course of the Work. Provide field or shop erected example of work complete with specified materials and workmanship.
- .2 Erect mock-ups at locations as specified and as acceptable to Consultant. Do not proceed with work for which mock-ups are required prior to Consultant's review of mock-ups.
- .3 Modify or remove and replace mock-ups as many times as required to secure acceptance of the Consultant. Such removal and replacement shall be done at no increase in either the Contract Price or the Contract Time.
- .4 Protect and maintain mock-ups until directed to be removed. Commence work demonstrated in mock-up only after review and acceptance of workmanship. If possible, mock-up may become part of finished work, at sole discretion, and with prior written acceptance, of Consultant.
- .5 Reviewed and accepted mock-ups will become standards of workmanship and material against which installed work will be compared.
- .6 Remove and replace materials or assemblies not matching reviewed mock-ups.
- .7 Resubmit mock-ups until written acceptance is obtained from Consultant.

1.8 INSERT LOCATION DRAWINGS

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

1.9 COORDINATION DRAWINGS

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

1.10 PROJECT RECORD DRAWINGS

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

1.11 WARRANTIES

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

1.12 MAINTENANCE MANUAL AND OPERATING INSTRUCTIONS

- .1 Submit one (1) copy of Operation and Maintenance Manuals at completion of Project on application for Certificate of Substantial Performance, Maintenance Manual shall consist of shop drawings, extended warranties and Project Data Book.
- .2 Include in Maintenance Manual one copy of each final approved shop drawing issued for Project of which have been recorded changes made during fabrication and installation caused by unforeseen conditions.
- .3 Submit extended warranties together in one report binder, properly titled and with a typed table of contents.
- .4 The Project Data Book shall:
 - .1 Consist of a hard-cover, black, vinyl-covered, loose-leaf, letter size binder.
 - .2 Have a title sheet, or sheets preceding data on which shall be recorded Project name, date, list of contents, and Contractors' and Subcontractors' names and addresses.
 - .3 Be organized into applicable sections of work with each Section separated by hard paper dividers with plastic covered tabs marked by Section.
 - .4 Contain only typed or printed information and notes, and neatly drafted drawings.

- .5 Contain maintenance instructions as specified in various Sections and as referenced in Section 01 77 19.
- .6 Contain brochures and parts lists on all equipment.
- .7 Contain a list of manufacturers and trade names of finishes and coatings applied.
- .8 Contain sources of supply for all proprietary products used in the work.
- .9 Contain lists of supply sources for maintenance of all equipment in Project of which more detailed information is not included above.
- .10 Contain finished hardware schedule.
- .11 Contain charts, diagrams and reports specified by Mechanical and Electrical Engineers.

1.13 AS-BUILT DOCUMENTS

- .1 Obtain from the Consultant and pay cost for one copy of Specifications and one set of white prints of the Contract Drawings at the commencement of Work, and, prior to the date of Substantial Performance, an extra set of white prints of Contract Drawings, for as-built purposes.
- .2 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .3 As Work progresses, clearly mark in a neat and legible form with red pen on Specifications and drawing white prints all significant changes and deviations from the Contract Drawings and Specifications caused by site conditions, Supplemental Instructions and Change Orders.
 - .1 Changes and deviations marked on as-built record drawings and specifications by reference to Supplemental Instructions, Change Orders and other documents are not acceptable.
- .4 Record the following changes and deviations on drawing white prints:
 - .1 Depths of various elements of foundation in relationship to the first floor level.
 - .2 Field changes of dimensions.
 - .3 Changes made by Addenda and change orders.
 - .4 Details not on original Contract Drawings.
 - .5 Other significant deviations and changes which are concealed in construction and cannot be identified by visual inspection.
- .5 Show actual locations of the following on drawing white prints:
 - .1 Access doors and panels.
 - .2 Inverts of services at key points within the building, at points where entering and leaving the building, and at the property lines. Dimension services in relation to the structure and building grid lines.
 - .3 Measured horizontal and vertical locations of site utilities and appurtenances, referenced to permanent surface improvements.
 - .4 Ductwork, piping, conduit, mechanical and electrical equipment and associated work.
 - .5 Concealed piping, conduit and equipment, including such items provided for future use.
- .6 Record the following information on the Specifications.
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
 - .3 Accepted substitutions and alternatives.
 - .4 Other approved changes and deviations to items specified.
- .7 Have white prints and specifications available for review at all times.

- .8 Final As Built Drawings: Prior to the date of Substantial Performance, allowing for Consultant's review, clearly, neatly and accurately transfer information from the marked-up drawing white prints to a set of clean white prints.
 - .1 Print lettering and numbers in size to match original.
 - .2 Lines may be drawn free hand, provided they are neat and accurate. Add "AS-BUILT RECORD" at each drawing title block. Should extensive changes and deviations to a drawing make the information illegible, re-draft the changed areas as required.
 - .3 Submit drawing white prints made containing as-built record information for Consultant's review. Correct as directed by Consultant.
 - .4 Submit finalized as-built record drawing transparencies and as-built record specifications to the Consultant two weeks prior to application for Certificate of Substantial Performance.

1.14 EXTRA MATERIALS

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

1.15 INSPECTION COMPANY REPORTS

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

1.16 PROGRESS PHOTOGRAPHS

- .1 Unless otherwise specified, provide and submit electronic pictures from six (6) difference vantage points on the project site as directed, and taken as soon as possible after the first day of each month throughout the project.

- .2 Identify the following in each picture:
 - .1 Location;
 - .2 Name of project;
 - .3 Name of Contractor;
 - .4 Name of Consultant
 - .5 Date
- .3 The Consultant may request changes of vantage points, either interior or exterior, as the job progresses. Consultant may further request more than six (6) vantage points.
- .4 Submit pictures with each application for payment.

1.17 PROGRESS BILLING

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

1.18 PRICING OF CHANGES TO WORK

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

1.19 WASTE MANAGEMENT

- .1 Contractor shall prepare and submit waste audit and reduction plan in compliance with the requirements of Ontario Regulations 102/94, Waste Audits and Waste Reduction Workplans and 103/94, Industrial, Commercial and Institutional Source Separation Programs under the Environmental Protection Act of Ontario. For definitions refer to Ontario Regulation 105/94, Definitions.

2 PRODUCTS

2.1 NOT USED

- .1 Not Used

3 EXECUTION

3.1 NOT USED

- .1 Not Used

END OF SECTION

PART 1 GENERAL**1. Requirements Included**

1.1 Inspection and testing, administrative and enforcement requirements.

1.2 Mock-ups.

2. Related Requirements

2.1 Section 01 78 10: Submission of samples to confirm product quality.

2.2 Section 01 60 10: Material and workmanship quality, reference standards.

3. Inspection

3.1 The Owner and the Consultant shall have access to the Work. If parts of the Work are in preparation at locations other than the Place of the Work, access shall be given to such work whenever it is in progress in accordance with CCDC2, 2020.

3.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Consultant instructions, or the law of the Place of the Work.

3.3 If the Contractor/ Construction Manager covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have the inspections or tests satisfactorily completed and make good such Work.

3.4 The Consultant may order any part of the Work to be examined if such work is suspected to be not in accordance with the Contract Documents. If, upon examination such work is found not in accordance with the Contract Documents, correct such work and pay the cost of examination and correction.

4. Independent Inspection Agencies

4.1 Independent Inspection/Testing Agencies will be engaged by the Contractor for the purpose of inspecting and/or testing portions of Work as described in the contract documents.

4.2 Costs of the above shall be allocated as a cost of the Work by the Contractor/ Construction Manager.

4.3 Provide equipment required for executing inspection and testing by the appointed agencies.

4.4 Employment of inspection/testing agencies does not relax the responsibility to perform Work in accordance with the Contract Documents.

4.5 If defects are revealed during inspection and/or testing, the appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defects and irregularities at no cost to the Owner. Pay costs for retesting and reinspection.

5. Access to Work

5.1 Allow inspection/testing agencies access to the Work, offsite manufacturing and fabrication plants.

5.2 Cooperate to provide reasonable facilities for such access.

6. Procedures

- 6.1 Notify the appropriate agency and the Consultant in advance of the requirement for tests, in order that attendance arrangements can be made.
- 6.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in the Work.
- 6.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store samples.

7. Rejected Work

- 7.1 Remove defective Work, whether the result of poor workmanship, use of defective products or damage and whether incorporated in the Work or not, which has been rejected by the Consultant as failing to conform to the Contract Documents. Replace or re-execute in accordance with the Contracts Documents.
- 7.2 Make good other Contractor/ Construction Manager's work damaged by such removals or replacements promptly.
- 7.3 If in the opinion of the Consultant it is not expedient to correct defective Work or Work not performed in accordance with the Contract Documents, the Owner may deduct from the Contract Price the difference in value between the Work performed and that called for by the Contract Documents, the amount of which shall be determined by the Consultant.

8. Reports

- 8.1 Submit two copies of inspection and test reports promptly to the Project Manager.

9. Mock-ups

- 9.1 Prepare mock-ups for Work specifically requested in the specifications and drawings. Include for Work of all Sections required to provide mock- ups.
- 9.2 Construct in locations acceptable to the Consultant and/or as specified in specific Section.
- 9.3 Prepare mock-ups for Consultants' review with reasonable promptness and in an orderly sequence, so as not to cause any delay in the Work.
- 9.4 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- 9.5 Remove mock-ups at conclusion of Work or when acceptable to the Owner or Consultant.

END OF SECTION

Part 1 GENERAL**1. Section Includes**

- 1.1 References and standards.
- 1.2 Standards producing industry organizations and their addresses.

2. Related Sections

- 2.1 Section 01 35 18 – LEED Requirements and Procedures.
- 2.2 Section 01 61 00 - Product Requirements.
- 2.3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

3. References

- 3.1 For Products or quality specified by association, trade, or other references or consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- 3.2 Conform to reference standard by where a specific date is established or required by code.
- 3.3 Obtain copies of standards where required by product specification sections.
- 3.4 Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Consultant shall be altered from the Contract Documents by mention or inference otherwise, in any reference document.

4. Standards Producing Industry Organizations

- 1.1 The following associations and organizations are cited in specification sections. Acronym, name, address, and Internet URL addresses are as follows.
- 1.2 Canadian Organizations:
 - .1 ACEC - Association of Consulting Engineers Compaines Canada, PO Box 4369 STN E, Ottawa, ON. K1S 5B3, URL <http://www.acec.ca>
 - .2 AWMAC - Architectural Woodwork Manufacturers Association of Canada, PO Box 1486, Blackfalds, AB. T0M 0J0, URL <http://www.awmac.com>
 - .3 Canada Green Building Council; 100 Murray Street, Suite 400, Ottawa, ON. K1N 0A1 URL www.cagbc.org
 - .4 CCA - Canadian Construction Association, 75 Albert St., Suite 400 Ottawa, ON. K1P 5E7, URL <http://www.cca-acc.com>
 - .5 CCDC - Canadian Construction Documents Committee, Refer to ACEC, CCA, CSC or RAIC, URL www.CCDC.org
 - .6 CFFM - Canadian Forces Fire Marshal, 101 Colonel By Drive, 8NT MGen George R. Pearkes Bldg., Ottawa, Ontario K1A 0K2 URL <http://www.dnd.ca/admie/dgcps/CFFMe.htm>
 - .7 CGA - Canadian Gas Association, 350 Albert Street, Suite 1220, Ottawa, ON. K1R 1A4, URL <http://www.cga.ca>
 - .8 CGSB - Canadian General Standards Board, L'Esplanade Laurier, 6th Floor East Tower, 140 O'Connor Street, Ottawa, ON. K1A 0S5, URL [Canadian General Standards Board - PSPC - Canada.ca \(tpsgc-pwgsc.gc.ca\)](http://www.CanadianGeneralStandardsBoard-PSPC-Canada.ca)
 - .9 CISC - Canadian Institute of Steel Construction, 445 Apple Creek Blvd., Suite 102, Markham, ON. L3R 9X7, URL <http://www.cisc-icca.ca>
 - .10 CLA - Canadian Lumbermen's Association, 27 Goulburn Avenue, Ottawa, Ontario, K1N 8C7 URL <http://www.cla-ca.ca>

- .11 CNLA - Canadian Nursery Landscape Association, 7856 Fifth Street, Milton, ON. L9T 2X8, URL [The Resource for Landscape... | Canadian Nursery Landscape Association \(cnla.ca\)](#)
- .12 CRCA - Canadian Roofing Contractors Association, 2430 Don Reid Drive, Suite 100, Ottawa, ON. K1H 1E1, URL <http://www.roofingcanada.com>
- .13 CSA - Canadian Standards Association Group, 178 Rexdale Blvd., Toronto, ON. M9W 1R3, URL [Product Certification & Standards Development - CSA Group](#)
- .14 CSC - Construction Specifications Canada, 120 Carlton Street, Suite 312, Toronto, ON. M5A 4K2, URL <http://www.csc-dcc.ca>
- .15 CSDMA - Canadian Steel Door Manufacturers Association, 18 King Street East, Suite 1400, Toronto, ON. M5C 1C4, URL <http://www.csdma.org/>
- .16 CSPI - Corrugated Steel Pipe Institute, PO Box 20104, Kitchener, ON. N2P 1B4, URL <http://www.cspi.ca>
- .17 CSSBI - Canadian Sheet Steel Building Institute, 445 Apple Creek Blvd., Suite 102, Markham, ON. L3R 9X7, URL <http://www.cssbi.ca>
- .18 CUFCA - Canadian Urethane Foam Contractor's Association, 3200 Wharton Way, Mississauga, ON. L4X 2C1, URL <http://www.cufca.ca>
- .19 CWC - Canadian Wood Council, 99 Bank Street, Suite 420, Ottawa, ON. K1P 6B9, URL <http://www.cwc.ca>
- .20 ECCC - Environment and Climate Change Canada, Inquiry Centre, 351 St. Joseph Blvd., Gatineau, QC. KIA 0H3, URL <http://www.ec.gc.ca>
- .21 EFC - Electro Federation of Canada, 190 Attwell Drive, Suite 560, Toronto, ON. M9W 6H8, URL <http://www.electrofed.com>
- .22 EIMA - EIFS Industry Manufacturer's Association, 513 West Broad Church, Suite 210, Falls Church, VA. U.S.A. 22046-3257, URL <http://www.eima.com>
- .23 MPI - The Master Painters Institute, 3665 Kingsway #300, Vancouver, BC. V5R 5W2, URL [MPI - Master Painters Institute - MPI](#)
- .24 NABA - National Air Barrier Association, 201-72 Princess Street, Winnipeg, MB. R3B 1K2, URL <http://www.naba.ca>
- .25 NLGA - National Lumber Grades Authority, 99 Bank Street, Suite 420, Ottawa, ON. K1P 6B9, URL <http://www.nlga.org/>
- .26 NRC - National Research Council, Building M-58, 1200 Montreal Road, Ottawa, ON. K1A 0R6, URL <http://www.nrc.gc.ca>
- .27 QPL - Qualification Program List, c/o Canadian General Standards Board, L'Esplanade Laurier, 6th Floor East Tower, 140 O'Connor Street, Ottawa, ON. K1A 0S5, URL [Program lists - Certification and Qualification - CGSB - PSPC - Canada.ca \(tpsgc-pwgsc.gc.ca\)](#)
- .28 RAIC - Royal Architectural Institute of Canada, 6118 James Bell Drive, Manotick, ON. K4M 1B3, URL <http://www.raic.org>
- .29 SCC - Standards Council of Canada, 55 Metcalfe Street, Suite 600, Ottawa, ON. K1P 6L5, URL [Standards Council of Canada | Standards Council of Canada \(scc-ccn.ca\)](#)
- .30 TTMAC - Terrazzo, Tile and Marble Association of Canada, 163 Buttermill Avenue, Unit 8, Concord, ON. L4K 3X8 URL <http://www.ttmac.com>
- .31 ULC - Underwriters' Laboratories of Canada, 7 Underwriters Road, Toronto, ON. M1R 3A9, URL [Home | UL Solutions in Canada](#)
- 1.3 USA Organizations:
- .1 AA - Aluminum Association, 1400 Crystal Drive, Suite 430, Arlington, VA., U.S.A. 22202, URL <http://www.aluminum.org>
- .2 AASHTO - American Association of State Highway and Transportation Officials, 555 12th Street N.W., Suite 1000, Washington, DC, U.S.A. 20004, URL [AASHTO - The home of transportation professionals](#)
- .3 AHA - American Hardboard Association, 1210W Northwest Hwy., Palatine, Illinois, U.S.A. 60067 URL : <http://www.hardboard.org>
- .4 AITC - American Institute of Timber Construction, 1010 South 336th Street #210, Federal Way, WA., U.S.A. 98003, URL [AITC | Pacific Lumber Inspection Bureau \(plib.org\)](#)

- .5 AMCA - Air Movement and Control Association Inc., 30 West University Drive, Arlington Heights, IL., U.S.A. 60004, URL <http://www.amca.org>
- .6 ANSI - American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, NY., U.S.A. 10036 URL <http://www.ansi.org>
- .7 APA - The Engineered Wood Association, 7011 S. 19th Street, Tacoma, WA., U.S.A. 98466-5333, URL <http://www.apawood.org>
- .8 API - American Petroleum Institute, 200 Massachusetts Avenue NW, Suite 1100, Washington, DC., U.S.A. 20001-5571, URL <http://www.api.org>
- .9 AHRI - Air Conditioning, Heating, and Refrigeration Institute, 2311 Wilson Blvd., Suite 400, Arlington, VA., U.S.A. 22201, URL [Air-Conditioning, Heating, and Refrigeration Institute | AHRI \(ahrinet.org\)](http://www.ahrinet.org)
- .10 ASHRAE - American Society of Heating, Refrigeration and Air-Conditioning Engineers, 180 Technology Parkway NW, Peachtree Corners, GA., U.S.A. 30092, URL <http://www.ashrae.org>
- .11 ASME - American Society of Mechanical Engineers, ASME Headquarters, Two Park Avenue, New York, NY., U.S.A. 10016-5990, URL <http://www.asme.org>
- .12 ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA., U.S.A. 19428-2959, URL <http://www.astm.org>
- .13 AWCI - Association of the Wall and Ceiling Industries International, 513 W Broad Street, Suite 210, Falls Church, VA., U.S.A. 22046 URL <http://www.awci.org>
- .14 AWPA - American Wire Producer's Association, 908 King Street, Suite 320, Alexandria, VA., U.S.A. 22314, URL <http://www.awpa.org>
- .15 AWPA - American Wood Preservers' Association, 2430 U.S. Highway 27, Clermont, FL., U.S.A. 34714, URL <http://www.awpa.com>
- .16 AWS - American Welding Society, 8669 NW 36 Street, #130, Miami, FL., U.S.A. 33166-6672, URL [American Welding Society \(AWS\) - Welding Excellence Worldwide](http://www.aws.org)
- .17 AWWA - American Water Works Association, 6666 W. Quincy Avenue, Denver, CO., U.S.A. 80235, URL <http://www.awwa.org>
- .18 ISAP - International Society for Asphalt Paving, 6776 Lake Drive, Suite 215, Lino Lakes, MN., U.S.A. 55014, URL <http://www.asphalt.org>
- .19 IEEE - Institute of Electrical and Electronics Engineers, IEE Corporate Office, 3 Park Avenue, 17th Floor, New York, New York U.S.A. 10016-5997 URL <http://www.ieee.org>
- .20 MSS - Manufacturers Standardization Society of the Valve and Fittings Industry, 1800 Diagonal Road, Suite 603, Alexandria, VA., U.S.A. 22314, URL [Manufacturers Standardization Society \(msshq.org\)](http://www.msshq.org)
- .21 NAAMM - National Association of Architectural Metal Manufacturers, 800 Roosevelt Road, Bldg. C, Suite 312, Glen Ellyn, IL., U.S.A. 60137, URL <http://www.naamm.org>
- .22 NEMA - National Electrical Manufacturers Association, 1300 17th Street N., #900, Arlington, VA., U.S.A. 22209, URL <http://www.nema.org>
- .23 NFPA - National Fire Protection Association, 1 Batterymarch Park, Quincy, MA., U.S.A. 02169-7471, URL <http://www.nfpa.org>
- .24 NFSA - National Fire Sprinkler Association, 514 Progress Drive, Suite A, Linthicum Heights, MD., U.S.A. 21090, URL <http://www.nfsa.org>
- .25 NHLA - National Hardwood Lumber Association, 6830 Raleigh Lagrange Road, Memphis, TN., U.S.A 38184, URL [National Hardwood Lumber Association \(nhla.com\)](http://www.nhla.com)
- .26 NSPE - National Society of Professional Engineers, 1420 King Street, Alexandria, VA., U.S.A. 22314, URL <http://www.nspe.org>
- .27 PCI – Precast/Prestressed Concrete Institute, 8770 W. Bryn Mawr Ave., Suite 1150, Chicago, IL., U.S.A. 60631, URL <http://www.pci.org>
- .28 PEI - Porcelain Enamel Institute, 1875 Old Alabama Road, Suite 1230, Roswell, GA., U.S.A. 30076, URL [Home - Porcelain Enamel Institute](http://www.pei.org)
- .29 SSPC - The Society for Protective Coatings, 800 Trumbull Drive, Pittsburgh, PA., U.S.A. 15205, URL <http://www.sspc.org>
- .30 TPI - Truss Plate Institute, 2670 Crain Highway, Suite 203, Waldorf, MD., U.S.A. 20601, URL <http://www.tpinst.org>

- .31 UL - Underwriters' Laboratories, 333 Pfingsten Road, Northbrook, IL., U.S.A. 60062, URL
<http://www.ul.com>

END OF SECTION

1. Temporary Services

- 1.1 Power, light and water connections are available on the site. Make arrangements with Landlord regarding the use of these services.
- 1.2 Distribution of temporary power during construction is the responsibility of the Contractor/ Construction Manager. Exposed extension cords are not permitted outside of the area leased by Owner.
- 1.3 Use washrooms as designated by the Landlord. Contractor/ Construction Manager to keep in clean condition, repair any damages caused by the Contractor/ Construction Manager's forces and comply with all regulations as issued by the Landlord.
- 1.4 The Contractor/ Construction Manager shall install a temporary telephone and fax machine on the site for his own use and that of the Consultants. All long-distance charges shall be paid for by the Contractor/ Construction Manager.
- 1.5 If applicable - Install temporary filters over all return air duct inlets that are in the area of construction. Install temporary filters over perimeter radiation heating elements. These filters shall be cleaned regularly and removed prior to occupancy.
- 1.6 Refer to Section 00 10 00 - Instructions to Bidders.

2. Removal of Temporary Facilities

- 2.1 Remove temporary facilities from the site when directed by the Owner or Consultant and when no longer required.

3. Security Control

- 3.1 The Contractor/ Construction Manager shall comply with the Landlord's and Owner's security requirements during construction.

4. Handling, Storage & Protection

- 4.1 Materials and products shall be handled in such a manner that no damage shall be done to the materials and products, the structure, the site and surrounding property.
- 4.2 Throughout the construction period, all construction material, tools and equipment, shall be delivered to the job site only as required and be kept within the confines of the work area. No materials to be stored in public lobbies, corridors, washrooms, electrical/telephone rooms or stairways at any time.
- 4.3 No area of the building outside the Owner's space shall be allocated for the storage of materials and products brought to the job unless duly approved by the Landlord. The storage area shall be kept tidy at all times and no other part of the property shall be used.
- 4.4 Materials and products shall be protected from damage during handling, storage and installation.
- 4.5 Cementitious and clay products shall be stored clear of the earth or concrete floors and away from walls.
- 4.6 Sand shall be kept dry and clean and shall be stored on tight, wooden platforms, and covered.
- 4.7 Metals shall be protected against corrosion, damage, dirt or dampness.
- 4.8 Packaged or bundled products shall be stored in original and undamaged condition with manufacturer's seals and labels intact.

- 4.9 Flat, solid support shall be provided for all sheet products during storage.
- 4.10 Paints shall be stored and mixed in a room assigned for this purpose by the Landlord. This room shall be kept under lock and key. Oily rags and any other combustible materials shall be removed every night. Every precaution shall be taken to prevent spontaneous combustion.
- 4.11 Damaged materials shall be made good or shall be replaced to the satisfaction of the Owner and Consultant.
- 5. Access and Deliveries**
- 5.1 Arrange for delivery of materials, products and equipment to arrive only when needed and at times to prevent interfering with vehicular traffic on the streets and pedestrian traffic on the sidewalks. Reference Rules and Regulations of the Landlord.
- 5.2 All construction materials and equipment shall be brought to the work site by the loading dock and using Landlord assigned elevators only. Confirm and schedule with the Landlord.
- 5.3 Parking of transport trucks, personal vehicles, etc., in the loading dock area is prohibited at all times. Contractor/ Construction Managers shall take all necessary precautions not to damage or mar elevator, walls, doors, floors and ceilings during unloading and loading. Contractor/ Construction Manager shall be held responsible for any such damages.
- 5.4 Personnel access and material deliveries to the Leased Premises are to be only by routes designated by the Landlord. The handling of items which due to their weight or dimension require special treatment, shall be received and arranged with the Landlord. All costs incurred will be borne by the Contractor/ Construction Manager.
- 5.5 Arrangements for after hours use of elevator and loading dock, for delivery of materials and/or garbage removal shall be made through the Landlord. All costs incurred will be borne by the Contractor/ Construction Manager.
- 5.6 Refer to Section 00 10 00 - Instructions to Bidders for additional requirements.
- 6. Plant and Machinery**
- 6.1 Formwork, scaffolding, ladders, tackle, planks, fans, screens, tarpaulins, tools, and machinery shall be provided for the proper execution of the structure or the finishes, be moved to suit the installation of work or other trades and be promptly removed at completion.
- 7. Temporary Fire Protection**
- 7.1 Operable fire extinguishers will be provided by the Contractor/ Construction Manager and will be kept within the work areas throughout the construction period. Extinguishers will be sufficient in number and of suitable types to combat a potential fire in the work area.
- 8. Electrical Power Shutdowns**
- 8.1 All requests for electrical power shutdowns shall be submitted for approval one (1) week or as instructed by the Landlord prior to the required shutdown. All costs incurred due to non-authorized shutdowns will be borne by the Contractor/ Construction Manager.

9. Air System Shutdowns

9.1 All requests for air system shutdowns shall be submitted for approval at least (48) hours before the shutdown date. Consequence of any air shutdown without prior approval and scheduling with the Landlord, will have severe penalties from the Landlord that shall be borne by the Contractor/ Construction Manager.

10. Water System Shutdown

10.1 All requests for water system shutdowns (fire line, domestic water, etc.) shall be submitted for approval at least (48) hours before the shutdown date. Consequence of any water shutdown without prior approval and scheduling with the Landlord, will have severe penalties from the Landlord.

11. Parking

11.1 All parking by the Contractor/ Construction Manager is his responsibility. The Landlord makes no representation that parking shall be available. Under no circumstances shall vehicles impede or block access to the garbage or loading dock facilities.

12. Access Panels

12.1 Provide access panels in walls and/or ceilings, as required by codes and as discussed with the Landlord, Owner and Consultants, to permit necessary access to equipment and/or services.

13. Garbage Removal

13.1 The Contractor/ Construction Manager shall ensure that all his sub-Contractor/ Construction Managers remove all garbage and debris from the Work on a daily basis and place it in the Contractor/ Construction Manager supplied garbage containers. Should it be necessary for the owner or Landlord to remove Contractor/ Construction Manager's garbage or debris due to inaction by the Contractor/ Construction Manager, the Contractor/ Construction Manager shall be invoiced for the cost thereof. Temporary storage of garbage or debris outside the Tenant's premises is not permitted.

13.2 Corridors, freight and passenger elevator lobbies, and other common areas are to be kept clear of any residual debris. Arrangements shall be made for elevator time to remove such debris to the loading dock area. As well, because space in the loading dock area is limited, such debris shall be immediately removed from the area, by whatever means possible, by the Contractor/ Construction Manager's responsible. Construction disposal bins are not allowed to remain in the receiving loading area.

13.3 Garbage of a flammable nature (eg. paper) shall not be allowed to accumulate, but shall be removed from the site as quickly as possible on the day of deposit.

14. Stairwell Doors

14.1 If applicable - All stairwell doors shall be kept closed at all times during construction. For fire prevention and other safety reasons, any construction site found with stairwell doors propped open shall be assigned a security officer until the situation is corrected. The cost for this coverage shall be charged to the Contractor/ Construction Manager.

15. Landlord's Rules and Regulations

15.1 Read and be governed by The Landlord's Rules and Regulations. Where conflicts occur between the Landlord's regulations and rules, inform the Consultant immediately for clarification.

END OF SECTION

1 GENERAL**1.1 GENERAL**

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

1.2 PRODUCT HANDLING

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

1.3 STORAGE AND PROTECTION

- .1 Store products on site with secure protection against all harmful environmental conditions. Prevent damage, adulteration, staining and soiling of materials while stored.
- .2 Protect prefinished metal surfaces by protective coatings or wrappings until time of final cleanup specified in Section 01 77 19. Protection shall be easily removable under work of Section 01 77 19 without damage to finishes.
- .3 Store manufactured products in accordance with manufacturers' instructions.
- .4 Store steel, lumber, masonry units, and similar products on platforms raised clear of ground.
- .5 Store finished products and woodwork under cover at all times.
- .6 Do not store products at locations or in such a manner that they damage previously completed work.
- .7 Storage and special protection requirements may be repeated and additional requirements specified, in other Sections.

1.4 SCHEDULING OF PRODUCT DELIVERY

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

1.5 DEFECTIVE PRODUCTS AND WORK

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

1.6 WORKERS, SUPPLIERS AND SUBCONTRACTORS

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

2 PRODUCTS**2.1 SPECIFIED PRODUCTS**

- .1 Products used for temporary facilities may have been previously used, providing they are sound in structural qualities.
- .2 Specified Options: The Work is based on materials, Products and systems specified by manufacturer's catalogued trade names, references to standards, by prescriptive specifications and by performance specifications.
 - .1 Where only one manufacturer's catalogued trade name is specified for a Product, the Product is single sourced and shall be supplied by the specified manufacturer.
 - .2 Where more than one manufacturer's catalogue trade name is specified for a Product, supply the Product from any one of those manufacturers specified.
 - .3 When a Product is specified by reference to a standard, select any Product from any manufacturer that meets or exceeds the requirements of the standard.
 - .4 When a Product or system is specified by prescriptive or performance specifications, Provide any Product or system which meets or exceeds the requirements of the prescriptive or performance specifications.
 - .5 The onus is on the Contractor to prove compliance with governing published standards, prescriptive specifications and with performance specifications.
- .3 Products, materials, equipment and articles (referred to as Products throughout the Contract Documents) incorporated in the Work shall be new, not damaged or defective, and of the quality standards specified, for the purpose intended. If requested, furnish evidence as to type, source and quality of Products Provided.
- .4 Where Contract Documents list acceptable Products or acceptable manufacturers, select as applicable, any one Product from any one manufacturer meeting performance of specifications.
- .5 Where Contract Documents require design of a Product or system, and minimum material requirements are specified, the design of such Product or system shall employ materials specified within applicable section. Where secondary materials or components are not specified, augment with materials meeting applicable code limitations, and incorporating compatibility criteria with adjacent work.
- .6 Defective Products, whenever identified prior to completion of the Work, will be rejected, regardless of previous reviews. Review of the Work by the Consultant or inspection and testing companies does not relieve the Contractor of the responsibility for executing the Work in accordance with the requirements of the Contract Documents, but is a precaution against oversight or error. Remove and replace defective Products and be responsible for delays and expenses caused by rejection at no additional cost to the Owner.
- .7 Should any dispute arise as to quality or fitness of Products, the decision rests strictly with Consultant based upon the requirements of the Contract Documents.
- .8 Unless otherwise indicated in the Contract Documents, maintain uniformity of manufacturer for any like item, material, equipment or assembly for the duration of the Work.

- .9 Products exposed in the finished work shall be uniform in colour, texture, range, and quality, and be from one production run or batch, unless otherwise indicated.
- .10 Permanent labels, trademarks and nameplates on Products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical, electrical, machinery or like rooms.
- .11 Owner retains right to select from choices available within specified Products for colours, patterns, finishes or other options normally made available. Submit full range of Product options in accordance with 01 33 00 for such selection.
- .12 Quality Control:
 - .1 Implement a system of quality control to ensure compliance with Contract Documents.
 - .2 Notify Consultant of defects in the Work or departures from intent of Contract Documents that may occur during construction. Consultant will recommend appropriate corrective action in accordance with requirements of the Contract.

3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in the Contract Documents, install or erect Products in accordance with manufacturer's printed instructions. Do not rely on labels or enclosures supplied with Products. Obtain printed instructions directly from manufacturers.
- .2 Notify Consultant in writing, of conflicts between the Contract Documents and manufacturer's instructions.
- .3 Improper installation or erection of Products, due to failure in complying with these requirements, authorizes Consultant to require removal and re-installation at no additional cost to the Owner.
- .4 Manufacturers' representatives shall have access to the Work at all times. Contractor shall render assistance and facilities for such access in order that the manufacturers' representatives may properly perform their function.

3.2 GALVANIC/DISSIMILAR METAL CORROSION

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

3.3 WORKMANSHIP

- .1 General:
 - .1 Execute the Work using workers experienced and skilled in the respective duties for which they are employed.
- .2 Do not employ an unfit person or anyone unskilled in their required duties.
- .3 Decisions as to the quality or fitness of workmanship in cases of dispute rest solely with Consultant, whose decision is final.
- .4 Upon request by the Consultant, submit proof, in the form of CCDC 11 - Contractor's Qualification Statement, of qualifications of Subcontractors to verify Subcontractor's qualifications and experience meet or exceed the requirements of the Contract Documents.

- .1 If, upon review of the Contractor's Qualification Statement, it is found that the Subcontractor does not meet the qualification requirements specified in the Contract Documents pertaining to the parts of the Work for which the Subcontractor has been retained, the Contractor shall replace the unqualified Subcontractor with a qualified Subcontractor, satisfactory to the Contractor and the Owner, at no additional cost to the Owner and at no increase in the Contract Time.
- .2 Coordination:
 - .1 Ensure cooperation of workers in layout of the Work. Maintain efficient and continuous supervision.
 - .2 Be responsible for coordination and placement of openings, sleeves and accessories.
- .3 Cutting and Remedial Work:
 - .1 Perform cutting and remedial work required to make parts of the Work come together. Coordinate the Work to ensure this requirement is maintained. Obtain permission from Consultant before commencing any cutting.
- .4 Fastenings:
 - .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
 - .2 Prevent electrolytic action and corrosion between dissimilar metals and materials.
- .5 Protection of work in progress:
 - .1 Take reasonable and necessary measures, including those required by authorities having jurisdiction, to Provide protection.
 - .2 Adequately protect parts of the Work completed or in progress. Parts of the Work damaged or defaced due to failure in providing such protection is to be removed and replaced, or repaired, as directed by the Consultant, at no additional cost to the Owner.
 - .3 Do not cut, drill or sleeve any load bearing structural member without written permission of Consultant, unless specifically indicated.
 - .4 Keep floors free of oils, grease or other materials likely to discolour them or affect bond of applied surfaces.
 - .5 Protect work of other Subcontractors from damage while doing subsequent work. Damaged work shall be made good by appropriate Subcontractors but at expense of those causing damage.
 - .6 Protect existing buildings, curbs, roads and lanes. If, during the Work, any buildings, curbs, roads or lanes are damaged, bear costs for repairs.
- .6 Existing Utilities:
 - .1 When breaking into or connecting to existing services or utilities, execute the Work at times approved by Owner, with a minimum of disturbance to Owner's ongoing operations, the Work, and traffic.
 - .2 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in a manner approved by authority having jurisdiction and stake or otherwise record location of capped service.
- .7 Operational requirements: Operable Products shall be Provided fully operational and ready for intended use.

END OF SECTION

1. Requirements Included

- 1.1 Reference standards.
- 1.2 Product quality, availability, storage, handling, protection, transportation.
- 1.3 Manufacturer's instructions.
- 1.4 Workmanship, coordination, cutting, fastenings.
- 1.5 Existing facilities.

2. Related Requirements

- 2.1 Section 01 40 00: Quality Control.

3. Reference Standards

- 3.1 Within the text of the specifications, reference may be made to the following standards:

ANSI	- American National Standards Institute
ASTM	- American Society of Testing and Materials
CEC	- Canadian Electrical Code (published by CSA)
CEMA	- Canadian Electrical Manufacturer's Association
CGSB	- Canadian General Standards Board
CPCA	- Canadian Painting Contractors' Association
CSA	- Canadian Standards Association
FM	- Factory Mutual Engineering Corporation
IEEE	- Institute of Electrical and Electronic Engineers
IPCEA	- Insulated Power Cable Engineers Association
NAAMM	- National Association of Architectural Metal Manufacturers
NBC	- National Building Code
NFC	- National Fire Code
NEMA	- National Electrical Manufacturers' Association
OBC	- Ontario Building Code
OFC	- Ontario Fire Code
TTMAC	- Terrazzo, Tile and Marble Association of Canada
ULC	- Underwriters' Laboratories of Canada.
SMACNA	- Sheet Metal and Air Conditioning National Contractors Association
ASRAE	- American Society of Heating, Refrigeration and Air Conditioning Engineers
SCAQMD	- South Coast Air Quality Management District
CRI	- Carpet and Rug Institute
GS	- Green Seal

Conform to these standards, in whole or in part as specifically requested in the specifications.

- 3.2 If there is question as to whether any product or system is in conformance with applicable standards, the Consultant reserves the right to have such products or systems tested to prove or disprove conformance.
- 3.3 The cost for such testing will be borne by the Contractor/ Construction Manager in the event of non-conformance.

4. Products and Materials

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

5. Availability

- 5.1 Immediately upon award of Contract, review Product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of Products are foreseeable, notify the Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work. Submit within one week of Award, a material & equipment order/projected date schedule and maintain weekly until all materials are delivered to site.
- 5.2 In the event of failure to notify the Consultant and should it subsequently appear that Work may be delayed for such reason, the Consultant reserves the right to substitute more readily available products of similar character, at no increase in Contract Price.

6. Storage, Handling and Protection

- 6.1 Handle and store Products in a manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- 6.2 Store packaged or bundled Products in original and undamaged condition with manufacturer's seals and labels intact. Do not remove from packaging or bundling until required in the Work.
- 6.3 Store and mix paints in a heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- 6.4 Remove and replace damaged Products at own expense and to the satisfaction of the Consultant and the Landlord.

7. Transportation

- 7.1 Pay costs of transportation of Products required in the performance of Work.
- 7.2 Transportation cost of Products supplied by the Owner will be paid for by the Owner. Unload, handle and store such Products, as directed by the Owner.

8. Manufacturer's Instructions

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

9. Workmanship**9.1 General**

- 9.1.1 Workmanship shall be the best quality, executed by workers experienced and skilled in the respective duties for which they are employed. Immediately notify the Consultant if required Work is such as to make it impractical to produce required results.
- 9.1.2 Do not employ any unfit person or anyone unskilled in their required duties. The Owner and Project Manager reserves the right to require the dismissal from the site, workers deemed incompetent, careless, insubordinate or otherwise objectionable.
- 9.1.3 Decisions as to the quality or fitness of workmanship in cases of dispute rest solely with the Project Manager, whose decision is final.

9.2 Coordination

- 9.2.1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
- 9.2.2 Be responsible for coordination and placement of openings, sleeves and accessories.

9.3 Concealment

- 9.3.1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- 9.3.2 Before installation, inform the Consultant if there is a contradictory situation. Install as directed by Consultant.

9.4 Location of Fixtures

- 9.4.1 Inform the Consultant of a conflicting installation. Install as directed by the Consultant.

9.5 Fastenings

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

9.5.7 Contractor shall not utilize mechanical fasteners to T-bar ceiling grid, base building window mullions or any other base building elements where permanent damage will occur.

9.6 Protection of Work in Progress

9.6.1 Adequately protect Work completed or in progress. Work damaged or defaced is to be removed and replaced, or repaired, as directed by the Consultant, at no increase in Contract Price.

9.6.2 Prevent overloading of any part of the building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of Consultant and Engineer.

END OF SECTION

1. Substitutions - Material and Products

- 1.1 The work of the Project shall be based upon using new materials and products specified or indicated by reference to standards, codes, specifications, a manufacturer's name, trade name or catalogue reference, except where a material or product is indicated as being reused. Where two or more trade names are specified, the choice shall be optional with the Contractor/ Construction Manager, but confirmed with Consultant.
- 1.2 The Contract Price shall be based on the materials and products specified, whether available or not at the time of tendering.
- 1.3 Requests for substitutions prior to Bid Date may not be accepted.
- 1.4 Materials and products specified without the "or other approved manufacturer" clause, following the name of the material or product shall be supplied without substitution.
- 1.5 Where the Specifications include the "or other approved manufacture" clause substitutions will be considered by the Consultant if:
- 1.5.1 The products specified are not available.
- 1.5.2 Substitute products to those specified, which are brought to the attention of, and considered by the Consultant as equivalent to those specified, may result in a change to the Contract Price.
- 1.5.3 Substitute products to those specified, which are brought to the attention of, and considered by the Consultant as superior to those specified will not result in a change to the Contract Price.
- 1.6 Substitutions may be proposed by the contractor under the following conditions:
- 1.6.1 Proposed substitutions shall show the material and product names and complete specifications and shall state what difference, if any, will be made in the Contract Price for each substitution, should it be accepted.
- 1.6.2 Should the proposed substitution be accepted either in part or in whole, the Contractor/ Construction Manager shall assume full responsibility when the substitution affects any other work. Any Drawing changes required as a result of the substitution shall be executed by the Consultant at the Contractor's expense.
- 1.6.3 Proposed substitutions shall satisfy all design conditions and other specified requirements.
- 1.6.4 Physical dimension requirements to satisfy the space limitations, static and dynamic weight limitations, structural properties, audible noise levels, vibration generation, interchangeability of parts or components, accessibility for maintenance, possible removal or replacement, colours, textures and compatibility with other materials, products, assemblies and components.
- 1.7 The Contractor/ Construction Manager shall obtain written approval of proposed substitutions from the Authority having Jurisdiction and shall submit the approval with the proposed substitution for the Consultant's consideration.

END OF SECTION

PART 1 GENERAL**1. Record Drawings As-Builts**

- 1.1 The Contractor, at his cost, shall obtain from the Consultant one set of white prints of the Contract drawings at the commencement of Work, and, one set of reproducible transparencies for "as-built" record drawing purposes prior to the date of Substantial Performance.
- 1.2 As Work progresses, clearly mark with red pen on white prints all significant changes and deviations from the Contract Drawings caused by the site conditions, Job Instructions, and Change Orders. Changes and deviations marked on as-built record drawings by reference to Job Instructions, Change Orders, and other documents are not acceptable.
- 1.3 Record the following changes and deviations:
- 1.3.1 Field changes of dimensions.
 - 1.3.2 Other significant deviations and change which are concealed in construction and cannot be identified by visual inspection.
- 1.4 Show actual locations of the following:
- 1.4.1 Access doors and panels.
 - 1.4.2 Ductwork, piping, conduit, mechanical and electrical equipment and associated work.
 - 1.4.3 Concealed piping, conduit, and equipment, including items intended for future use.
- 1.5 Have white prints available at all times for inspection.
- 1.6 Prior to the date of Substantial Performance, allowing sufficient time for review, clearly, neatly and accurately transfer information from the marked-up white prints to the reproducible transparencies. Print lettering and numbers in size to match original. Lines may be drawn freehand but shall be neat and accurate. Add "As-Built Record" at each drawing title block. Should extensive changes and deviations to a drawing make the information illegible, re-draft the drawing.
- 1.7 Submit two (2) white prints made from reproducible transparencies containing as-built record information for review, as specified for shop drawings.
- 1.8 Submit two (2) copies of finalized drawings as record of as-built conditions.
- 1.9 Submit one (1) disk/ CD of as-built drawings on the most recent version of AutoCAD.

END OF SECTION

1. Approvals

- 1.1 Submit written request in advance to Landlord or lawful agent and confirm with the Consultant of any cutting or alteration, which affects Structural integrity or any element of the Project:
- .1 Efficiency, maintenance, or safety of any operational element.
 - .2 Visual qualities of sight-exposed elements.
 - .3 Work of Owner or separate contractor.
 - .4 Fireproofing of Base Building.
 - .5 Base Building Rules and Regulations.
 - .6 Furniture & equipment locations.

2. Inspection

- 2.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- 2.2 After uncovering, inspect conditions affecting performance of work.
- 2.3 Beginning of cutting or patching means acceptance of existing conditions.
- 2.4 Coordinate with Landlord as required.

3. Execution

- 3.1 Perform cutting, fitting, and patching to complete the Work.
- 3.2 Remove and replace defective and non-conforming work.
- 3.3 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical work.
- 3.4 Perform work to avoid damage to other work.
- 3.5 Prepare proper surfaces to receive patching and finishing.
- 3.6 Cut rigid materials using power saw or core drill or as approved by Landlord.
- 3.7 Restore work with new products in accordance with Contract Documents.
- 3.8 Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- 3.9 At penetration of fire-rated wall, ceiling, or floor construction, completely seal voids with fire-rated material, full thickness of construction element. Submit sample of proposed material for approval prior to use, in accordance with Section 01 78 10. The Contractor/ Construction Manager shall maintain all rated separations in accordance with applicable codes.
- 3.10 Refinish surfaces to match adjacent finishes; for continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.
- 3.11 Any damage to existing fireproofing to Base Building is to be corrected to match original. Verify type of fireproofing used.
- 3.12 Contractor/ Construction Manager shall obtain prior approval for any and all core drilling from the Landlord and Project Manager. Contractor/ Construction Manager is responsible to provide x-rays of floor slab for inspection by the Landlord and his consultants before work is to proceed.
- 3.13 All concrete core drilling is at the Contractor's/ Construction Manager's risk with respect to repair of any power or telephone conduit that may be cut, and with respect to third party claims that may result from services interruptions.

END OF SECTION

PART 1 GENERAL**1. Clean-up During Construction**

- 1.1 During construction, maintain the work in a tidy condition and free from accumulation of waste products, debris, rubbish, dust, etc. other than that caused by the Owner, other Contractor's/ Construction Manager's or their employees.
- 1.2 At reasonable intervals during progress of work, clean up site, building and access, and dispose of waste materials, rubbish and debris. Provide containers and locate on site for collection of waste materials, rubbish and debris as outlined in the Instruction to Bidders - Section 00 10 00 and base building rules and regulations. Do not allow waste materials, rubbish and debris to accumulate and become unsightly or hazardous.
- 1.3 Move waste materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly prepared surfaces. No storage of dusty material will be allowed.
- 1.4 Conduct clean-up and disposal operations to comply with local ordinances. Burning or burying of rubbish and waste materials on the Project site is not permitted. Do not dispose of volatile fluid wastes (such as mineral spirits, oil or paint thinner) in storm or sanitary sewer systems or into streams or waterways. Remove waste materials, rubbish and debris from the site daily and legally dispose of at public or private dumping areas off the Owner's property.
- 1.5 Vacuum clean interior building areas when ready to receive finish painting and continue vacuum cleaning on an as-needed basis until building is ready for acceptance or occupancy.
- 1.6 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable by the sealant manufacturer and the material fabricator.
- 1.7 Where the accumulation of dirt does not respond to the washing or cleaning, refer the condition to the Project Manager, with recommendations as to the remedial action required; but, do not undertake any cleaning procedure of a more severe nature without the written approval of the Project Manager.
- 1.8 Remove temporary protective materials and coatings.
- 1.9 Comply with all Landlord Rules and Regulations.

2. Final Cleaning

- 2.1 Upon attaining Substantial Performance of the work, remove surplus products, tools, construction machinery and equipment not required for the performance of the remaining work. Also remove waste products and debris and leave the work clean and suitable for occupancy by the Owner unless otherwise specified.
- 2.2 All final cleaning shall be carried out under this section and the building shall be left in condition to meet the approval of the Owner and Consultants. The final cleaning shall not commence until authorized by the Consultants. This work shall include, without being limited to, the cleaning of floors, walls, windows, ceilings, fixtures and equipment, the removal of debris and all work required on the interior and exterior to complete the building and site cleaning.
- 2.3 All floors shall be cleaned in a manner acceptable to the Consultants, Owner, Landlord, and per product specification guides.
- 2.4 Stains, paint, grease, oil, temporary protection and covers, plaster, mortar droppings, labels, caulking and sealant compounds, and dirt shall be removed. Damaged painted areas shall be touched up. All surfaces and items, including without being limited to, walls, ceilings, doors, windows, glass, partitions, fixtures, hardware, mechanical and electrical equipment shall be dusted and/or polished and washed and/or cleaned with suitable material.

- 2.5 Replace broken and scratched glass.
- 2.6 Remove temporary heating, ventilating and air conditioning filters if units were operated during construction. Vacuum clean ducts, fans, blowers and coils if units were operated without filters during construction.
- 2.7 Ensure that the inside of all air handling systems are clean and free from dust and debris when building is turned over to Owner.
- 2.8 Vacuum out and wipe clean all electrical and signal panels, switchboards, transformers and other electrical equipment.
- 2.9 Use experienced workpersons or professional cleaners for final cleaning. Use only cleaning materials recommended by manufacturer of surface to be cleaned. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.
- 2.10 Completion of Contract shall not be attained until the Contractor/ Construction Manager has removed surplus products, tools, construction machinery and equipment. He/She/They shall also have removed waste products and debris, other than that caused by the Owner, other contractors or their employees.

END OF SECTION

1 GENERAL**1.1 GENERAL INSTRUCTIONS**

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

1.2 FINAL CLEANING

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

1.3 CLOSE-OUT SUBMITTALS

- .1 Collect reviewed submittals, and assemble required closeout submittals executed by Subcontractors, Suppliers, and manufacturers. Prior to submitting closeout submittals to the Consultant, undertake the following:

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

1.4 SUBSTANTIAL PERFORMANCE OF THE WORK

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

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

1.5 WARRANTY PERIOD

- .1 Provide on-going review and attendance to call-back, maintenance and repair problems during the warranty periods.
- .2 At the beginning of the 24th month after Substantial Performance of the Work, the Owner, Contractor and Consultant, along with key Subcontractors as designated, shall carry out a complete review of the built project to determine which deficiencies are to be rectified under the warranty.

- .3 Contractor shall be responsible for timely written notification of Owner, and Consultant a minimum of three (3) months prior to such end of warranty period inspection and any delay in such notification shall extend such warranty period until proper notification is received by Owner, and Consultant.

2 PRODUCTS

2.1 NOT USED

- .1 Not Used

3 EXECUTION

3.1 NOT USED

- .1 Not Used

END OF SECTION

1. Material List

- 1.1 Within 5 days of award of contract, submit a complete list of manufactured materials to Consultant.
- 1.2 List is required to enable Consultant to verify that materials meet Specifications prior to submission of shop drawings or installation, and to select colours and/or patterns.
- 1.3 Should materials not meeting requirements be included, the Consultant will require re-submission.
- 1.4 Only the listed materials shall be used, unless otherwise approved by the Consultant.

2. Shop Drawings

- 2.1 The term shop drawings means drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data that are to be provided by the Contractor/ Construction Manager to illustrate details of a portion of the work.
- 2.2 The Contractor/ Construction Manager shall arrange for the preparation of clearly identified shop drawings called for by the Contract Documents or as the Consultant or Project Manager may reasonably request. No product shall be accepted without approved shop drawings.
- 2.3 Prior to submission to the Project Manager and Consultant, the Contractor/ Construction Manager shall review all shop drawings. By this review the Contractor/ Construction Manager represents that he/she/they has determined and verified all field measurements, field construction criteria, materials, catalogue numbers, and similar data, or will do so, and that he/she/they has checked and coordinated each shop drawing with the requirements of the work and of the Contract Documents. The Contractor/ Construction Manager's review of each shop drawing shall be indicated by stamp, date, and signature of a responsible person.
- 2.4 The Contractor/ Construction Manager shall submit drawings to the Project Manager for distribution to the Consultants for review, with reasonable promptness and in orderly sequence and allowing 3 working days time for consultants' review, so as to cause no delay in the work or the work of other Contractor/ Construction Manager. If either the Contractor/ Construction Manager or the Project Manager so requests they shall jointly prepare a schedule fixing the dates for the submission and return of shop drawings. Shop drawings shall be submitted in the form of 1 PDF document via email. At the time of submission the Contractor/ Construction Manager shall notify the Project Manager and Consultant in writing of any deviation in the shop drawings from the requirements of the Contract Drawings.
- 2.5 The Contractor/ Construction Manager shall make any changes in the shop drawings that the Consultants may require consistent with the Contract Documents and re-submit unless otherwise directed by the Project Manager. When resubmitting, the Contractor/ Construction Manager shall notify the Project Manager in writing of any revision other than those requested by the Consultant or Project Manager.
- 2.6 Shop Drawings shall define the division of responsibility between the trades and items shown on shop drawings. Shop drawings shall show materials, methods of construction, and attachment or anchorage, erection, connections and other details necessary to complete the work. Shop drawings shall show cross-references to Drawings and specifications.
- 2.7 The review by the Consultant is for the sole purpose of ascertaining conformance with the general design concept. The review shall not mean that the Consultant approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor/ Construction Manager submitting same and such review does not relieve Contractor/ Construction Manager of his/her/their responsibility for errors or omissions in the shop drawings, or his/her/their responsibility for meeting all requirements of the Contract Documents. The Contractor/ Construction Manager is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or technique of construction and installation, and for coordination of the work of all its subtrades and work of other Contractor/ Construction Managers.

2.8 Any adjustments made on the shop drawings by the Consultant or Project Manager are not intended to change the Contract Sum. If the Contractor/ Construction Manager deems that such adjustments affect the value of the work, he/she/they shall so state in writing before proceeding with the fabrication and installation of the work.

3. Samples

3.1 For the purpose of this Article samples means: samples, models and templates.

3.2 Samples shall be submitted to the Project Manager in a number as specified in the respective Section in sufficient time to the permit review process before the item is needed to be installed or as directed otherwise.

3.3 If either the Contractor/ Construction Manager or the Project Manager or so requests, they shall jointly prepare a schedule fixing the dates for submission and return of samples, including time allowances for re-submissions.

3.4 Samples shall be submitted by the Contractor/ Construction Manager only.

3.5 Samples which are "rejected" shall be removed by the Contractor/ Construction Manager.

3.6 Samples will receive consideration only when hand delivered or couriered accompanied with a covering transmittal/letter signed by the Contractor/ Construction Manager. The package shall contain a list of the samples being submitted, the name of the project, Contractor/ Construction Manager, Subcontractor, manufacturer, brand, also the project number, the specification article and paragraph numbers to which the samples refer, and such additional information as may be required by the specification for the particular item being furnished. A copy of the transmittal/letter shall be enclosed with the samples and any sample received without the identification transmittal/letter will be considered "unclaimed goods" and will be held for a limited time only.

3.7 Each sample shall be labelled to indicate the names of the project, Contractor/ Construction Manager, Subcontractor, manufacturer, brand, job number, as required.

3.8 Where samples are rejected by the Project Manager or the Consultant, new samples shall be submitted as soon as possible after notification of the rejection and shall be marked "Second submission" in addition to the other information required on the label.

3.9 The review by the Consultant is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that the Consultant approves the detail design inherent in the samples, responsibility for which shall remain with the Contractor/ Construction Manager submitting same and such review shall not relieve the Contractor/ Construction Manager of his responsibility for errors or omissions or of his responsibility for meeting all requirements of the Contract Documents.

3.10 The cost of all samples shall be paid by the Contractor/ Construction Manager including all carrying charges, which shall be prepaid.

3.11 Where colour, pattern, or texture is a criterion submit the full range of samples.

3.12 Field samples and mock-ups may form part of the work if so agreed by the Consultant and/or Project Manager.

3.13 Construct each sample or mock-up complete, including the work of all trades.

3.14 Reviewed samples or mock-ups will become standards of workmanship and material against which installed work shall be checked.

4. Mock-Up

4.1 None required.

5. Access Panels and Access Doors

- 5.1 Before commencing the installation of mechanical and electrical work, the Contractor/ Construction Manager with his mechanical and electrical Subcontractor shall prepare on a set of Drawings provided for that purpose, a complete layout of all access panels and access doors which will be required. These layouts shall be submitted for review as specified for shop drawings, and shall show exact sizes and locations of access panels and doors. Revisions may be required to the layout before final review.
- 5.2 Items requiring access panels shall be located behind removable materials wherever possible. The Landlord, Owner and Project Manager may relocate the location of access panels to more unobtrusive locations.
- 5.3 Access panels must be reviewed and approved by Landlord prior to closing ceilings.
- 5.4 Contractor/ Construction Manager to provide sample of access panel for approval by Owner and Consultant, prior to installation. Access panels and doors shall be finished to match adjacent wall and/or ceiling finish unless otherwise specified or indicated.

6 Progress Schedule

- 6.1 The Contractor/ Construction Manager shall prepare a detailed progress schedule for the work, for the approval of the Owner and Project Manager, indicating the dates for:
- 6.1.1 The submission of shop drawings for the various Sections of the Work; the shop drawings schedule for mechanical and electrical work shall contain a list identifying the contents of each shop drawing by subject matter, item, manufacturer's name and supplier's name.
- 6.1.2 The commencement and completion of each major division of work, including the work to be done by the Subcontractor.
- 6.1.3 Show the sequencing of the work and the final completion dates of each phase.
- 6.2 Furnish monthly progress reviews as related to the work schedule. Reviews to include comments on both the parts of the Work and the general progress of the project. Correlate reviews to progress payment applications.
- 6.3 Update and re-issue the work schedule as required to conform to monthly progress reviews.
- 6.4 Maintain progress schedule on the job site, as the work progresses.

7. Minutes of Job Meetings

- 7.1 At definitely prescribed times, which will be determined, after the commencement of the work, the Contractor/ Construction Manager will organize job meetings and shall send out notices, stating the time and place, to all Sub-Contractor/ Construction Managers or other persons whose presence is required at the meetings. The Contractor/ Construction Manager will take note of persons attending the job meeting; submit to all parties attending and to the Consultant, minutes of meeting, which shall show major decisions made and instructions given within 2 working days.

8. Responsibilities

- 8.1 Contractor is responsible for arranging delivery and pickup of all materials, samples, and submittals.

END OF SECTION

1 GENERAL**1.1 WARRANTIES**

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

2 PRODUCTS**2.1 NOT USED**

- .1 Not Used

3 EXECUTION**3.1 NOT USED**

- .1 Not Used

END OF SECTION

PART 1 GENERAL**1.1 Work Included**

- 1.1.1 Comply with Division 1, General Requirements and all documents referred to therein.
- 1.1.2 Remove and/or relocate designated building equipment and fixturing.
- 1.1.3 Remove existing partitions, walls, ceilings, etc. as required for proper performance of the Work.
- 1.1.4 Remove, refurbish and store for re-use, elements, items and equipment as designated in the Contract Documents for refurbishing.
- 1.1.5 Provide all labor, materials services and equipment, required to complete the demolition and removal of work as indicated on the drawings as specified herein.
- 1.1.6 Obtain owner's approval prior to commencing.

1.2 Related Work (as applicable)

- 1.2.1 The following list is non-exclusive. The Contractor/ Construction Manager shall coordinate all items as needed to complete the Work.

- | | |
|--|--|
| 1. Construction Facilities & Temporary Control | Section 01 50 00 |
| 2. Substitutions | Section 01 63 00 |
| 3. Cutting and Patching | Section 01 73 30 |
| 4. General Divisions (if applicable) | Sections 01 through 13 |
| 5. Mechanical (refer to engineer documents) | Section 23 Heating, Ventilation & Air Conditioning |
| 6. Electrical (refer to engineer documents) | Section 26 |

1.3 References

- 1.3.1 Occupational Health and Safety Regulations.
- 1.3.2 Landlord Building Rules and Regulations.
- 1.3.3 All Codes, Laws, and Regulations as applicable.

1.4 Quality Assurance

- 1.4.1 Use adequate number of skilled workers, thoroughly trained and experienced in the trade and who are completely familiar with the specified requirements and the methods needed for the proper performance of the Work of this section.

1.5 Protection

- 1.5.1 Do not interfere with use of adjacent building premises. Maintain free and safe passage to and from all areas occupied during demolition.
- 1.5.2 Maintain all exiting requirements.
- 1.5.3 Provide, erect and maintain barricades, lighting and guard rails as required by the applicable authorities for the protection of occupants of buildings and workers.

PART 2 - PRODUCTS**2.1 Salvage Materials**

- 2.1.1 All base building elements such as ceiling tiles, light fixtures, air troffers, base building standard door hardware, base building standard egress doors, etc. shall remain the property of the Landlord. Return to the Landlord unless otherwise directed by the Landlord. Contractor/ Construction Manager will coordinate with the Landlord and Project Manager prior to commencement of the Work.
- 2.1.2 Except where noted otherwise, maintain possession of all material being demolished, remove from site and dispose in a lawful and orderly manner.
- 2.1.3 Remove, store and protect for future installation, those items as required in the Documents and return good unused items to the Landlord.
- 2.1.4 All products used for cleaning, stripping and completion of the Work shall be non-toxic.
- 2.1.5 Provide the same products or products compatible with the existing structure as needed to patch or extend existing work. The Contract Documents will not define the products or standards in existing structure. Provide the same product, finish and workmanship to make work complete and consistent to identical standards of quality.

PART 3 EXECUTION**3.1 Preparation**

- 3.1.1 Demolition work to be carried out after hours with smoke detectors turned off.
- 3.1.2 Provide 48 hours notice for shut down of services.
- 3.1.3 Contractor to install filter medium over pleated filters in compartment units.
- 3.1.4 Carry out the Work in a manner that is in accordance with the Landlord's Rules and Regulations and imposes minimal effect on the adjoining tenancies.
- 3.1.5 Obtain approvals for all work where volatile or noxious substances are involved and when noisy work is required.
- 3.1.6 Provide and pay for all permits as required for completion of the Work.
- 3.1.7 Erect and maintain all hoarding, partitions curtains and dust-proof enclosures as required to prevent the spread of dust, fumes and smoke to other areas of the building.
- 3.1.8 CEASE OPERATIONS AND NOTIFY THE CONSULTANT IMMEDIATELY IF MOLD OR ASBESTOS IS ENCOUNTERED OR SUSPECTED.
- 3.1.9 Provide temporary support to structural or mechanical elements affected by or adjacent to the work as required.

3.2 **General Scope**

- 3.2.1 Demolish in an orderly and careful manner and return to base building conditions those areas as shown in the contract Documents (Plans, details and specification).
- 3.2.2 Remove, clean, repair and refurbish those items, products and systems as directed in the contract Documents. Store and make available for future use or as directed.
- 3.2.3 Leave substrate in a smooth and pristine condition, suitable to receive new finishes.
- 3.2.4 Make good all base building finishes affected by demolition and/or new construction.

3.3 **Floors**

- 3.3.1 If applicable - remove all existing floor finish material as shown on the drawings.
- 3.3.2 If applicable - strip and scrape all adhesives, cements and glues in a manner approved by the Landlord. Supply sufficient ventilation in accordance with all applicable health and safety regulations when solvents are used. Coordinate with Landlord.
- 3.3.3 Patch all damaged areas with a suitable product compatible with existing substrate materials.
- 3.3.4 Fill and level floor where required.
- 3.3.5 Apply sealer to concrete slab where required.

3.4 **Ceilings**

- 3.4.1 When required remove existing ceiling tiles as required. Salvage non-broken, clean tiles. Stack in an orderly manner, protected from damage and make available for re-installation.
- 3.4.2 Purchase additional new tiles of the same type and size as new to replace any damaged material or those areas left open, due to access requirements. Leave on floor with salvaged existing material in original manufacturers shipping cartons. Purchase this product from the original manufacturer, when possible, to maintain consistency.
- 3.4.3 During construction repair, straighten, refinish or replace any "T-Bar" suspension grid members which are damaged.
- 3.4.4 Re-install all base building luminaries to match Base Building standard. Maintain pattern and count consistent with typical open floor layout unless otherwise directed.

3.5 **Walls**

- 3.5.1 Where noted remove all applied wall finishes from the Base Building walls, columns and bulkheads, etc.
- 3.5.2 Skim coat any areas affected by the finish removal (i.e. wall covering). Patch, sand and make good all affected areas. Prime and make ready for future finish.
- 3.5.3 Patch and repair all damaged surfaces or areas.

3.6 **Doors, Frames and Sidelights**

- 3.6.1 Where noted, remove existing doors, rough bucks and frames as designated for relocation or re-use.
- 3.6.2 Clean frame of previous installation materials, paint, dirt, overspray, etc.
- 3.6.3 Refinish doors and frames where marks, scratches and surface damage has occurred. Every reasonable attempt should be made to return the product to an acceptable level of finish, based on age and condition. Repairs to extreme damage (other than that expected through normal wear and tear) is not required under this section.
- 3.6.4 Remove any hardware to complete the rehabilitation of doors and frames. Clean, store and make available for re-use. Replace any fasteners if signs of previous installation are apparent (rounded edges, scratches, etc.).
- 3.6.5 Store and make ready for re-installation.

3.7 **Mechanical**

- 3.7.1 Refer to Mechanical Specifications, drawings and details for further requirements.
- 3.7.2 If applicable, remove all plumbing fixtures and piping. Cap off drain lines at or below slab and patch floor penetration.
- 3.7.3 Remove all unused water lines, drains, piping, isolation valves and materials.
- 3.7.4 Remove all Tenant ducts, supplementary air handling, exhaust fans, related controls and equipment associated with the Tenant demolition.

3.8 **Electrical**

- 3.8.1 Refer to Electrical Specifications, drawings and details for further requirements.
- 3.8.2 Where applicable, remove all secondary wiring and terminal devices for telephone and data communication systems. All conduit and zone distribution boxes shall remain.
- 3.8.3 Where applicable remove all unused wiring, terminal devices and conduit back to the base building panel. Restore panels to original condition by plugging knockouts and removing breakers.

3.9 **Clean-up**

- 3.9.1 Remove all debris and rubbish from the site.
- 3.9.2 Remove all tools and equipment from the site.
- 3.9.3 Floors shall be left broom clean and ready for new tenant leasehold improvements.
- 3.9.4 Material left on the floor shall be stored in areas designated by the Landlord.
- 3.9.5 Coordinate review of site by Consultant upon completion of work.

END OF SECTION

PART 1: GENERAL

1.1 GENERAL REQUIREMENTS

- .1 General Conditions, Supplementary Conditions and Division 01 apply to this Section.

1.2 SUMMARY

- .1 Work of this Section includes the following:
 - .1 Testing and measurement for floor flatness and levelness,
 - .2 Trowelling, levelling, and floating of floor surfaces for ready for applied finishes.

1.3 DEFINITIONS

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

1.4 REFERENCE STANDARDS

- .1 American Concrete Institute (ACI):
 - .1 ACI 117-06, Specifications for Tolerances for Concrete Construction and Materials and Commentary
 - .2 ACI 302.1R-04, Guide for Floor and Slab Construction
- .2 Canadian Standards Association (CSA):
 - .1 CSA A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

1.5 ADMINISTRATION REQUIREMENTS

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

1.6 SUBMITTALS

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

- .4 Suspended Slabs: Measurement of 3mm (1/8") or greater than $\pm 6\text{mm}$ ($1/4"$) measurement (80% tolerance allowance) will be considered as a failed test and will require flash patching.

1.7 PROJECT CLOSEOUT SUBMISSIONS

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

1.8 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Work of this Section shall be executed by a company that has adequate equipment and skilled tradespersons to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified, during a period of at least the immediate past five years.

1.9 SITE CONDITIONS

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

PART 2: PRODUCTS

2.1 MATERIALS

- .1 Underlayment: Cementitious, self levelling, single component, polymer modified underlayment and manufacturer's recommended primer, for application thicknesses to a minimum feather edge to 13mm (1/2"); acceptable.
 - .1 Basis of Design Materials:
 - .1 MAPEI Canada Inc., Planipatch
 - .2 Sika Canada Ltd., Sikafloor Level 125
 - .3 W.R. Meadows of Canada, Sure-Flo ST
- .2 Overlayment: Cementitious, self levelling, single component, polymer modified overlayment, for application thicknesses to a minimum of 13mm to 25mm (1/2" to 1").
 - .1 Basis of Design Materials:
 - .1 Sika Canada Ltd., Sikafloor Level 25CA
 - .2 W.R. Meadows of Canada, Sure-Flo FT 100
- .3 Topping: Cementitious, self levelling, single component, polymer modified overlayment, for application thicknesses to a minimum of 19mm to 50mm (3/4" to 2").
 - .1 Basis of Design Materials:
 - .1 MAPEI Canada Inc., Mapicem Premix
 - .2 Sika Canada Ltd., Sikafloor Level 25CA
 - .3 W.R. Meadows of Canada, Gem-Crete TO
- .4 Primer: As recommended by concrete topping manufacturer to ensure compatibility of concrete topping system supplied.
- .5 Patching and Flash Patching Materials: As recommended by concrete topping manufacturer to ensure compatibility of concrete topping system supplied.

- .6 Joint Sealant: Refer to Section 07 92 00: Sealants.

PART 3: EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

.1 Primer:

- .1 Apply primer in recommended thickness to dry, clean, and stable substrates.
- .2 Remove all existing treatments such as coatings, sealers, wax, latex compounds, impregnations and curing agents.
- .3 Remove all dirt, dust, laitance, grease, oils, and foreign matter, which will interfere with the penetration and bond of primer.
- .4 Prepare concrete, cement and dense substrates by mechanical means to achieve an open-textured, fine-gripping surface (ICRI - CSP 3 minimum).
- .5 Remove weak concrete and surface defects such as blowholes and spalls fully exposed and repair with recommended concrete patch prior to priming and levelling.
- .6 Fill all cracks and holes to prevent seepage of the primer through to lower areas.

.2 Topping installation on Concrete Substrates:

- .1 Minimum compressive strength of substrates shall be 20 MPa (2900 psi) at 28 days with a minimum tensile strength of 1 MPa (145 psi) at the time primers are applied.
- .2 Moisture Vapour Emission Rates of the substrate should comply and meet the requirements of the proposed floor covering. Please consult the manufacturer of the final floor finish for advice.
- .3 Prior to placing the underlayment, ensure that all sources of premature drying or direct sunlight are blocked off to avoid accelerated curing and reduced physical properties. The stated ambient and substrate application temperatures are to be achieved before installation and should be maintained for a period of at least three (3) days thereafter.
- .4 Should colder conditions prevail, make allowances for the use of indirect and vented heaters to achieve and maintain the application temperatures required. Where temperatures exceed 30 deg C, refer to and follow ACI hot weather application and protection guidelines.
- .5 Quickly and without delay, pour or pump the mixed material onto the primed surface in a ribbon pattern, ensuring that a wet edge is maintained; spread by trowel or pin rake to the required thickness, achieving the necessary coverage over high points.
- .6 Allow topping to air cure. Do not wet cure or use curing and sealing compounds.

END OF SECTION

PART 1 GENERAL**1.1 Work Included**

- 1.1.1 Comply with Division 1, General Requirements by Contractor/Construction Manager and all documents referred to therein.
- 1.1.2 Provide all labour, materials, products, equipment and services required to complete the metal fabrications work necessary and/or indicated in the Drawings and specified herein including all metal work which is not specified elsewhere.

1.2 References

- 1.2.1 ASTM A36/A36M-87 Standard Specification Structural Steel
- 1.2.2 ASTM A 167-87 Standard Specification for Stainless and Heat resisting Chromium-Nickel Steel plate sheet and Strip
- 1.2.3 ASTM A525-87 Standard Specification for General Requirements for Steel Sheet, Zinc coated (Galvanized) by the Hot-Dip process
- 1.2.4 CGSB 1-GP-40M Primer, structural Steel, Oil Alkyd Type
- 1.2.5 CGSB 1-GP-121M Coating, Vinyl, Pretreatment for Metals
- 1.2.6 CGSB 1-GP-122M Primer, Vinyl, Anticorrosive
- 1.2.7 CGSB 1-GP-181M Coating, Zinc Rich, Organic, Ready-Mix
- 1.2.8 CAN3-G40.21-M87 General Requirements, for Rolled or Welded Structural Quality Steel
- 1.2.9 CAN3-G40.21-M87 Structural Quality Steels
- 1.2.10 CSA G-16.4-M1981 Hot Dip Galvanizing of Irregularly Shaped Articles
- 1.2.11 CSA W47.2-M1987 Certification of Companies for Fusion Welding of Aluminum
- 1.2.12 CSA W59-1989 Welded Steel Construction (Metal Arc Welding)

1.3 Qualifications of Welding

- 1.3.1 Welding of steel and aluminum shall be undertaken only by a fabricator approved by the Canadian Welding Bureau and CSA W47.2, as may be applicable.

1.4 Design

- 1.4.1 Design the work of this Section in accordance with the Ontario Building Code (National Building Code of Canada), the By-laws of the local municipality.
- 1.4.2 Maximum deflection for individual members shall not exceed 1/360th, of the span.
- 1.4.3 Work of this Section, which will support other items or will be required to support structural loads of any nature shall be designed by a Professional Structural Engineer registered in Ontario and who shall affix his/her professional seal and signature to the shop drawings for such items.

- 2.1.17 Setting material for setting standards: "Por-Rok" manufactured by Hallemite Products Ltd., "In-Pakt" manufactured by C.C. Chemicals Limited, or other approved non-metallic setting material.
- 2.2 Fabrication**
- 2.2.1 Verify all dimensions on the site before preparing Drawings or proceeding with shop work.
- 2.2.2 Insofar as practical, execute fitting and assembly in the shop with various parts of assemblies ready for erection at the building site.
- 2.2.3 Fabricate the work true to dimensions and square. Accurately fit members with hairline joints, and join using adequate fastening.
- 2.2.4 Construct finished work free from distortion and defects detrimental to appearance and performance.
- 2.2.5 File or grind exposed welds smooth and flush. Do not leave grinding marks. Construct internal and external corners with sharp lines. Provide continuous welds unless otherwise approved by the Consultant in writing.
- 2.2.6 Fabricate metal work complete with all components required for anchoring to concrete; bolting or welding to structural frames; standing free; or resting in frames or sockets in a safe and secure manner.
- 2.2.7 Weld all connections unless approved otherwise in writing by the Consultant.
- 2.2.8 Execute exposed fastenings neatly where approved and of the same material, colour and finish as the base metal, on which they occur.
- 2.2.9 Countersink exposed fastenings, where such are approved in writing, and make as inconspicuous as possible with bolts cut off flush with nuts. Construct fastenings of the same material and finish as the base material on which they occur.
- 2.2.10 Insulate contact surfaces to prevent electrolysis due to metal-to-metal contact or between metal and masonry or concrete. Use bituminous paint, butyl tape, building paper or other approved means.
- 2.2.11 Thoroughly de-scale steel work before delivery to project site. Remove roughness and irregularities, clean with a wire brush, remove oil and grease and prime with one shop coat of paint to a 2 mil (0.05 mm) thickness.
- 2.2.12 Interior steel in high humidity areas shall be commercially sandblasted in accordance with SSPC-SP6 to remove mill scale prior to application of primer.
- 2.2.13 Interior steel work supplied under this Section to be primed with one shop coat of interior primer unless noted otherwise.
- 2.2.14 Do not prime the following surfaces:
1. Steel to be encased in concrete
 2. Non-ferrous metals
 3. Surfaces and edges to be field welded. If painted, remove paint for field welding for a distance of at least 2" (50 mm) in all sides of the paint.
- 2.2.15 Hot-dip galvanize steel in exterior and unheated areas, unless noted otherwise.
- 2.2.16 Hot-dip galvanized steel, where specified, in accordance with CSA Standard G164 (coating weight as prescribed for type of article), or ASTM Designation A525 G90 (coating weight; 1.25 oz./sq.ft.) (380 g/sq m), as applicable. Galvanize after fabrication where possible. Follow recommended precautions to avoid embrittlement of the base metal by over-pickling, over heating or during galvanizing.
- 2.2.17 Touch-up galvanized steel where galvanizing is damaged during installation with zinc rich primer.

2.3 Anchor Bolts and Other Means of Anchorage

- 2.3.1 Provide all anchor bolts and expansion bolts or other means of anchorage required for building into floors, walls and ceilings, where it is necessary to secure metal and wood to concrete, masonry or steel work. Supply anchor bolts, nuts and similar hardware to the respective Sections for fastening.

2.4 Miscellaneous Steel Sections

- 2.4.1 Supply and install all steel items not indicated to be supplied under other Sections.
- 2.4.2 Where sections are required to be built in by other Sections, supply such members to the respective Sections.

2.5 Concealed Support Elements & Framing

- 2.5.1 Supply and install all support elements and framing as shown on the Drawings for the items listed herein. Construct supports from rolled steel sections assembled by welding.
- 2.5.2 Design supports to withstand, within acceptable deflection limitations, their own weight, the weight of the items to be supported, loads imposed by the motion of supported items, where applicable, and all live loads, static and dynamic which might be applied to the supported items in the course of their normal function. Design supports with a safety factor of (3). Design supports further as required to accommodate structural deflection.

2.6 Coat Rods

- 2.6.1 Supply for installation under Architectural Cabinetwork Section 06 41 11, chrome coat rods for coat closet.
- 2.6.2 Rod shall be one-piece full width of closet, 1-1/4" (30 mm) diam. x 0.065" (1.6 mm) wall thickness chromed steel.
- 2.6.3 Provide flanges and intermediate support brackets at maximum 3'-0" (900 mm) centres: to fasten to underside of shelf.

PART 3 EXECUTION**3.1 Installation**

- 3.1.1 Install miscellaneous metals work in the correct locations and positions, plumb, level, structurally sound, securely fastened, free from defects detrimental to finished appearance and to the approval of the Consultant.
- 3.1.2 Install the work of this Section using skilled craftsmen and in accordance with manufacturer's recommendations where applicable.
- 3.1.3 After installation, spot prime field bolt heads and nuts, filed rivets, welds and any abrasions or damage to the shop coat of the primer.
- 3.1.4 Perform drilling of steel and/or concrete masonry to fasten the work of this Section.
- 3.1.5 All surfaces prime painted under the Section shall be free from runs, sags, crawls and other defects. This Section shall repair any such defects to the satisfaction of the Consultant.

END OF SECTION

PART 1 GENERAL**1.1 Related Sections**

1.1.1 Finish carpentry: Section 06 20 00.

1.1.2 Architectural Cabinetwork: Section 06 41 11.

1.2 Quality Assurance

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

1.2.2 Plywood identification: by grade mark in accordance with applicable CSA standards.

PART 2 PRODUCTS**2.1 Lumber Material**

2.1.1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:

2.1.1.1 CAN/CSA-O141.

2.1.1.2 NLGA Standard Grading Rules for Canadian Lumber.

2.1.2 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:

2.1.2.1 S2S is acceptable for utility use where concealed.

2.1.2.2 Board sizes: "Standard" or better grade.

2.1.2.3 Dimension sizes: "Standard" light framing or better grade.

2.1.2.4 Post and timbers sizes: "Standard" or better grade.

2.2 Panel Materials

2.2.1 Douglas fir plywood (DFP): to CSA O121, standard construction.

2.2.2 Canadian softwood plywood (CSP): to CSA O151, standard construction.

2.2.3 Must not contain added Urea Formaldehyde.

2.3 Accessories

2.3.1 Nails, spikes and staples: to CSA B111.

2.3.2 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.

2.3.3 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.

2.4 **Wood Preservative**

2.4.1 Surface-applied wood preservative: clear or copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.

PART 3 **EXECUTION****3.1** **Preparation**

3.1.1 Treat surfaces of material with wood preservative, before installation.

3.1.2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and one minute soak on plywood.

3.1.3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

3.2 **Installation**

3.2.1 Comply with requirements of NBC/OBC, supplemented by the following paragraphs.

3.2.2 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding and other work as required.

3.2.3 Align and plumb faces of furring and blocking to tolerance of [1:600].

3.2.4 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.

3.2.5 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized fasteners.

3.2.6 Install wood backing, dressed, tapered and recessed slightly below top surface of roof insulation for roof hopper.

3.2.7 Install sleepers as indicated.

3.3 **Erection**

3.3.1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.

3.3.2 Countersink bolts where necessary to provide clearance for other work.

3.4 **Backboards**

3.4.1 Where noted, provide electrical equipment backboards for mounting electrical equipment as indicated on drawings. Backboards to have a one-hour fire rating.

END OF SECTION

PART 1 GENERAL**1.1 Related Sections**

- 1.1.1 Work to comply with Division 1 General Requirements.
- 1.1.2 Section 06 24 00 Laminated plastic work.
- 1.1.3 Section 06 41 11 Architectural woodwork.
- 1.1.4 Section 08 71 00 Supply of finishing hardware.
- 1.1.5 Section 09 96 00 Painting and finishing.

1.2 References

- 1.2.1 AWMAC Quality Standards for Architectural Woodwork.

1.3 Samples

- 1.3.1 Submit samples in accordance with Section 01 78 10.

1.4 Shop Drawings

- 1.4.1 Submit shop drawings in accordance with Section 01 78 10.
- 1.4.2 Indicate details of construction, profiles, jointing, fastening and other related details.
- 1.4.3 Indicate all materials, thicknesses, finishes and hardware.

1.5 Requirements of Regulatory Agencies

- 1.5.1 Wood fire rated frames and panels: listed and labeled by an organization accredited by Standards Council of Canada in conformance with CAN4 S104M and CAN4 S105M for ratings specified or indicated.

1.6 Product Delivery, Storage and Handling

- 1.6.1 Protect materials against dampness during and after delivery.
- 1.6.2 Store materials in ventilated areas, protected from extreme changes of temperature or humidity.

PART 2 PRODUCTS**2.1 Lumber Material**

- 2.1.1 Softwood lumber: unless specified otherwise, S4S, moisture content 19% or less in accordance with following standards:
 - 2.1.1.1 CAN/CSA O141-05.
 - 2.1.1.2 NLGA Standard Grading Rules for Canadian Lumber.
 - 2.1.1.3 AWMAC custom grade, moisture content as specified.
- 2.1.2 Machine stress-rated lumber is acceptable for all purposes.

2.1.3 Hardwood lumber: moisture content 9% or less in accordance with following standards:

2.1.3.1 National Hardwood Lumber Association (NHLA).

2.2 Panel Material

2.2.1 Douglas fir plywood (DFP): to CSA O121, standard construction.

2.2.2 Canadian softwood plywood (CSP): to CSA O151, standard construction.

2.2.3 Hardwood plywood: to CSA O115.

2.2.4 Poplar plywood (PP): to CSA O153, standard construction.

2.2.5 Interior mat-formed wood particleboard: to CAN3-O188.1.

2.2.6 Hardboard: to CAN/CGSB-11.3.

2.2.7 Medium density fibreboard (MDF): to ANSI A208.2, density 769 kg/m³.

2.2.8 All composite wood product to have no added urea formaldehyde.

2.3 Accessories

2.3.1 Nails and staples: to CSA B111; galvanized to CAN/CSA-G164 for exterior work, interior humid areas and for treated lumber; [plain] [copper] [stainless steel] finish elsewhere.

2.3.2 Wood screws: to CSA B35.4, type and size to suit application.

2.3.3 Splines: Wood.

2.3.4 Adhesive: Recommended by manufacturer.

PART 3 EXECUTION

3.1 Installation

3.1.1 Do finish carpentry to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.

3.1.2 Scribe and cut as required, fit to abutting wall and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.

3.1.3 Form joints to conceal shrinkage.

3.2 **Construction**

3.2.1 Fastening.

3.2.1.1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.

3.2.1.2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.

3.2.1.3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round cleanly cut hole and plug with wood plug to match material being secured.

3.2.1.4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.

3.2.2 Standing and running trim.

3.2.2.1 Butt and cope internal joints of baseboards to make snug, tight, joint. Cut right angle joints of casing and base with mitred joints.

3.2.2.2 Fit backs of baseboards and casing snugly to wall surfaces to eliminate cracks at junction of base and casing with walls.

3.2.2.3 Make joints in baseboard, where necessary using a 45m scarf joint.

3.2.2.4 Install door and window trim in single lengths without splicing.

3.2.3 Interior and exterior frames.

3.2.3.1 Set frames with plumb sides and level heads and sills and secure.

3.2.4 Paneling

3.2.4.1 Secure paneling and perimeter trim using adhesive recommended for purpose by manufacturer. Fill nail holes caused by temporary fixing with filler matching wood in colour.

3.2.4.2 Secure paneling and perimeter trim using concealed fasteners.

3.2.4.3 Secure paneling and perimeter trim using countersunk screws plugged with matching wood plugs.

3.2.5 Shelving.

3.2.5.1 Install shelving on ledgers or shelf brackets as noted on millwork details and hardware schedules.

3.2.6 Hardware.

3.2.6.1 Refer to Section 08 71 00 - Finish Hardware and drawings for supply of hardware.

END OF SECTION

PART 1 GENERAL**1.1 Related Section**

- 1.1.1 Work to comply with Division 1 General Requirements.
- 1.1.2 Section 06 20 00 Finish Carpentry.
- 1.1.3 Section 06 41 11 Architectural Woodwork.

1.2 Samples

- 1.2.1 Submit samples in accordance with Section 01 78 10.
- 1.2.2 Submit duplicate finishes samples.

1.3 Storage and Protection

- 1.3.1 Maintain relative humidity between 25 and 60% at 22mC during storage and installation.

PART 2 PRODUCTS**2.1 Materials**

- 2.1.1 Laminated plastic for flatwork: to CAN3-A172-M79. Refer to Finish Schedule and drawings for specifications.
- 2.1.2 Laminated plastic for postforming work: to CAN3-A172-M79, Grade PF. Refer to Finish Schedule and drawings for specifications.
- 2.1.3 Laminated plastic backing sheet: supplied by same manufacturer as facing sheet; not less than 0.51 mm thick and same thickness and colour as shown on drawings. Sanded one side.
- 2.1.4 Laminated plastic liner sheet: supplied by same manufacturer as facing sheet; not less than 0.51 mm thick, white colour.
- 2.1.5 Particleboard core: to CAN3-O188.1-M78, high density Grade to suit application, sanded faces, of thickness indicated.
- 2.1.6 Laminated plastic adhesive: urea resin adhesive to CSA O112.5-M1977 or as per manufacturer specifications.
- 2.1.7 Sealer: water resistant sealer or glue acceptable to laminate manufacturer.
- 2.1.8 Sealants: in accordance with Section 07 09 00 - Sealants, as selected by Consultant. Must meet or exceed SCAQMD Rule #1168.
- 2.1.9 Draw bolts and splines: as recommended by fabricator.

2.2 **Fabrication**

- 2.2.1 Comply with CAN3-A172, Appendix 'A'.
- 2.2.2 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.
- 2.2.3 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- 2.2.4 Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Use continuous lengths up to 3000 mm. Keep joints 600 mm from sink cutouts.
- 2.2.5 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.
- 2.2.6 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.
- 2.2.7 Apply laminate backing sheet to reverse side of core of plastic laminate work.
- 2.2.8 Apply laminated plastic liner sheet where indicated.

PART 3 **EXECUTION****3.1** **Installation**

- 3.1.1 Install work plumb, true and square, neatly scribed to adjoining surfaces.
- 3.1.2 Make allowances around perimeter where fixed objects pass through or project into laminated plastic work to permit normal movement without restriction.
- 3.1.3 Use draw bolts and splines in countertop joints. Maximum spacing 450 mm oc, 75 mm from edge. Make flush hairline joints.
- 3.1.4 Provide cutouts for inserts, grilles, appliances, outlet boxes and other penetrations. Round internal corners, chamfer edges and seal exposed core.
- 3.1.5 At junction of laminated plastic counter backsplash and adjacent wall finish, apply small bead of sealant.

3.2 **Protection**

- 3.2.1 Cover finished laminated plastic veneered surfaces with heavy kraft paper or put in cartons during shipment. Protect installed laminated surfaces by approved means. Do not remove until immediately before final inspection.

END OF SECTION

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General Conditions, Division 01 - General Requirements, and other applicable specification sections in the Project Manual apply to the work specified in this Section.

1.2 SUMMARY

- A. Scope: Provide labor, material, equipment, related services, and supervision required, including, but not limited to, manufacturing, fabrication, erection, and installation for architectural woodwork as required for the complete performance of the work and as shown on the Drawings and as herein specified.

1.3 REFERENCES

- A. General: The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by the basic designation only. The edition/revision of the referenced publications shall be the latest date as of the date of the Contract Documents, unless otherwise specified.
- B. American Wood Council (AWC):
1. AWC DCA, "Design for Code Acceptance."
- C. Architectural Woodwork Institute (AWI):
1. AWI AWS, "Architectural Woodwork Standards."
- D. ASTM (ASTM):
1. ASTM D 523, "Standard Test Method for Specular Gloss."
 2. ASTM E 84, "Standard Test Method for Surface Burning Characteristics of Building Materials."
- E. Forest Stewardship Council (FSC):
1. FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- F. Hardwood Plywood and Veneer Association (HPVA):
1. ANSI/HPVA HP-1, "American National Standard for Hardwood and Decorative Plywood" (copyrighted by HPVA, ANSI approved).
 2. HPVA HPH, "Hardwood Plywood Handbook." 3, HPVA VSG, "Veneer Species Guide."

1.4 SUBMITTALS

- A. General: See Section 01 33 00 - Submittal Procedures.
- B. Product Data: Submit product data showing material proposed. Submit sufficient information to determine compliance with the Drawings and Specifications. Submit product data for each type of product and process specified and incorporated into items of architectural woodwork during fabrication, finishing, and installation.
- C. Shop Drawings: Submit shop drawings for each product and accessory required. Include information not fully detailed in manufacturer's standard product data, including, but not limited to, location of each item in dimensioned plans and elevations, large scale details, attachment devices, and other components. Architectural Woodwork 06 40 00.
- D. Samples:
1. Submit samples for initial selection. Submit samples of each specified finish. Submit samples in form of manufacturer's charts showing veneers and finishes available.
 2. Submit samples for verification purposes. Additional samples may be required to show fabrication techniques and workmanship.
- E. Quality Control Submittals:
1. Fire Retardant Treatment Data: Submit fire retardant treatment data for material treated to reduce combustibility.
- F. Submittals that are required to comply with requirements for LEED® certification, as defined by the Canadian Green Building Council, include, but shall not be limited to, the following:
1. Recycled Content Materials (Credits MR 4): Provide product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
 2. Regional Materials (Credits MR 5): Provide product data for regional materials indicating location and distance from the Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Distance shall be within 500 miles (805 Km) of the Project Site. Include statement indicating cost for each

regional material and, if applicable, the fraction by weight that is considered regional.
RETAIN BELOW IF APPLICABLE TO THE PROJECT.

- a. Include requirements for Canada per Columbia LEED® Compliant Product Guide.
3. Certified Wood (Credit MR 7): Provide product invoice documentation, including, but not limited to, product description, FSC-claim, and chain-of-custody certificates, confirming what quantity, if any, of wood-based materials are certified in accordance with the Forest Stewardship Council (<http://www.fsc.org>) guidelines for wood products.
4. Low-Emitting Materials (Credit IEQ 4.4): Submit cut sheet and/or CARB TPC certification by the manufacturer confirming that products (i.e., plywood, particleboard, medium density fiberboard, insulation, etc.) contain no added urea-formaldehyde resins as outlined in LEED® Green Building Rating System.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances, and regulations of Federal, State, and local authorities having jurisdiction. Obtain necessary approvals from such authorities. Architectural Woodwork 06 40 00.
- B. Quality Standard: Comply with AWI AWS for grades of architectural woodwork, construction, finishes, and other requirements. Provide AWI certification labels or AWI certificates of compliance indicating that woodwork meets requirements of grades specified.
 1. Comply with applicable requirements of standards published by the Scientific Equipment and Furniture Association (SEFA).
- D. Surface Burning Characteristics: Provide materials with the following characteristics as determined by testing identical products per ASTM test method indicated below, by Underwriters Laboratories, Inc. (UL), Intertek Testing Services (ITS), Hardwood Plywood and Veneer Association (HPVA), or another inspecting and testing agency acceptable to authorities having jurisdiction.
 1. Surface burning characteristics shall not exceed values indicated below, tested per ASTM E 84. FLAME SPREAD OF 200 OR BELOW IS ACCEPTABLE FOR CLASS III (CLASS C) CODE REQUIREMENTS.
 - a. Flame Spread: 200.
 - b. Smoke Developed: 450.
 2. Veneer of a thickness of 1/28 inch (0.9 mm) or less can be applied to a fire-resistant core and still retain fire-resistant core properties according to AWC DCA.
- E. Mock-Ups: Prior to installation of the work, fabricate and erect mock-ups for each type of finish and application required to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mock-ups using materials indicated for final unit of work.
- F. Pre-Installation Conference: Conduct pre-installation conference in accordance with Section 01 31 19 - Project Meetings. Prior to commencing the installation, meet at the Project site to review the material selections, installation procedures, and coordination with other trades. Mock-ups shall be reviewed during the pre-installation conference. Pre-installation conference shall include, but shall not be limited to, the Contractor, the Installer, and any trade that requires coordination with the work. Date and time of the pre-installation conference shall be acceptable to the Owner and the Architect.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the Project site in supplier's or manufacturer's original wrappings and containers (or suitable equivalent protection), labeled with supplier's or manufacturer's name, material or product brand name, and lot number, if any.
- B. Store decorative hardwood plywood and fabricated products in dry interior locations where temperature is maintained between 60°F (16°C) and 90°F (32°C) and relative humidity is maintained between 30 percent and 55 percent.

- C. Remove or loosen plastic wrappings. Sticker individual panels to hasten acclimatization. Architectural Woodwork 06 40 00.
- D. Cover decorative hardwood plywood panels and fabricated products to protect from exposure to light until installed.
- E. Protect decorative hardwood plywood from edge and surface damage.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install work until building is enclosed, wet-work is completed and nominally dry, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. LEED® Requirements:
 - 1. Recycled Content Materials (Credits MR 4): Provide building materials with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content constitutes a minimum of 30 percent of the cost of materials used for the Project. See LEED® Green Building Rating System.
 - 2. Regional Materials (Credits MR 5): Provide a minimum of 10 percent (based on cost), of building materials that are regionally extracted, processed, and manufactured.
 - 3. Certified Wood (Credit MR 7): Provide a minimum of 50 percent (by cost) of wood-based materials that are produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001. Wood-based materials include, but shall not be limited to, materials made from made wood, engineered wood products, or wood-based panel products.
 - 4. Low-Emitting Materials (Credit IEQ 4.4): Do not use composite wood and agrifiber products that contain urea-formaldehyde resin.
- 1. Panel:
 - a. 70 percent to 97 percent mixed FSC content
 - b. Manufacture according to ANSI/HVPA HP-1.
 - c. Core construction shall be FSC-certified.
- 2. Thickness: As shown on the Drawings.
- 3. Veneers:
 - 1) Species: as per drawings
 - 2) Color Selection: as per drawings
 - 3) Grade: 1
 - 4) Cut: as per drawings
 - 5) Veneer Match: as per drawings.
- 4. Factory Finish: Provide clear UV-cured acrylic coating on all sides (UV Wood™).
 - a. Gloss Level: Flat, 15 to 30 gloss units measured on 60 degree gloss meter per ASTM D 523.
- 5. Factory Finish: Provide pre-applied custom stained finish (Custom Colors™). Finish shall be a pre-applied, UV-cured, 100 percent solid stain applied in the factory under controlled conditions. Provide finish as indicated or, if not indicated, as selected by the Designer from the manufacturer's standards.
 - a. Gloss Level: Flat, 15 to 30 gloss units measured on 60 degree gloss meter per ASTM D 523.

- B. Fire-Retardant Treated Materials: Where indicated, use materials impregnated with fire retardant chemical formulations indicated, by a pressure process or by other means acceptable to authorities having jurisdiction, to produce products with surface burning characteristics specified.
- a. Use chemical formulations that do not bleed through or otherwise affect finishes.
 - b. Mill lumber before treatment and implement special procedures during treatment and drying processes that shall prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of treated architectural woodwork.
 - c. Discard treated material that does not comply with requirements of referenced woodworking standard. Do not use twisted, warped, bowed, discolored, or otherwise damaged or defective material.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Examine areas and conditions under which the work is to be installed, and notify the Contractor in writing, with a copy to the Owner and the Interior Designer, of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.
- a. Beginning of the work shall indicate acceptance of the areas and conditions as satisfactory by the Installer.

3.2 PREPARATION

- A. Condition work to average prevailing humidity conditions in installation areas before installing. Before installing work, examine shop-fabricated work for completion and complete work as required.

3.3 INSTALLATION

- A. General: Install in accordance with reviewed product data, final shop drawings, manufacturer's written recommendations, and as indicated on the Drawings.
- B. Quality Standard: Install architectural woodwork to comply with AWI AWS for the same grades specified in Part 2 - Products of this Section for type of architectural woodwork involved.
- C. Fire Retardant-Treated Wood: Handle, store, and install fire retardant-treated wood to comply with recommendations of chemical treatment manufacturer, including, but not limited to, those for adhesives used to install architectural woodwork.
- D. Installation Tolerances: Install architectural woodwork plumb, level, true, and straight with no distortions. Shim as required with concealed shims.

3.4 ADJUSTING AND CLEANING

- A. Repair damaged and defective work where possible to eliminate functional and visual defects. Where not possible to repair, replace the work.
- B. Clean architectural woodwork on exposed and semi-exposed surfaces. Touch-up shop-applied finishes to restore damaged or soiled areas.

3.5 PROTECTION

- A. Provide final protection and maintain conditions in a manner acceptable to the installer that shall ensure that the work shall be without damage at time of Substantial Completion.

END OF SECTION

PART 1 GENERAL**1.1 Related Sections**

1.1.1 Work to comply with Division 1 General Requirements.

1.1.1 Section 06 24 00 - Plastic Laminate.

1.2 References

1.2.1 AWMAC Quality Standards for Architectural Woodwork.

1.3 Shop Drawings

1.3.2 Submit shop drawings in accordance with Section 01 78 10 - Submittals.

1.3.3 Indicate details of construction, profiles, jointing, fastening and other related details.

1.3.3.1 Scale: profiles [full size], details [1/2 full size].

1.3.4 Indicate all materials, thicknesses, finishes and hardware.

1.3.5 Indicate locations of all service outlets in casework, typical and special installation conditions, and all connections, attachments, anchorage and location of exposed fastenings.

1.4 Mock-ups

1.4.1 Not required.

1.5 Delivery, Storage, and Handling

1.5.1 Protect millwork against dampness and damage during and after delivery.

1.5.2 Store millwork in ventilated areas, protected from extreme changes of temperature or humidity.

PART 2 PRODUCTS**2.1 Lumber Material**

2.1.1 Softwood lumber: unless specified otherwise, S4S, moisture content 9% or less for interior work, in accordance with following standards:

2.1.1.1 CSA 0141-05 for Softwood Lumber.

2.1.1.2 NLGA National Lumber Grades Authority.

2.1.1.3 AWMAC Custom grade standards.

2.1.1.4 All substrate materials must not have a flamespread rating greater than 150.

2.1.2 Hardwood lumber: moisture content 9% or less in accordance with following standards:

2.1.2.1 National Hardwood Lumber Association (NHLA), January 1982.

2.1.2.2 AWMAC custom grade standards [Eighth Edition - v2 - 2005].

2.2 **Panel Materials**

- 2.2.1 Douglas fir plywood (DFP): to CSA 0121-M1978, standard construction.
- 2.2.2 Canadian softwood plywood (CSP): to CSA 01510M1978, standard construction.
- 2.2.3 Hardwood plywood: to CSA 0115-M1982.
- 2.2.4 Poplar plywood (PP): to CSA 0153-M1980, standard construction.
- 2.2.5 Interior mat-formed wood particleboard: to CAN3-0188.1-M78.
- 2.2.6 Hardboard: to CAN/CGSB-11.3-M87.
- 2.2.7 Medium density fibreboard (MDF): to ANSI A208.2, density 769 kg/m³.
- 2.2.8 Laminated plastic: to CAN3-A172-M79.
- 2.2.9 Wood substrates to have no added Urea Formaldehyde.

2.3 **Fasteners**

- 2.3.1 Nails and staples: to CSA bill-1974.
- 2.3.2 Wood screws: to CSA B35.4-1972.

2.4 **Sealants**

- 2.4.1 Sealant: in accordance with Section 07 90 00 - Sealants; colour as selected by Consultants.

2.5 **Casework**

- 2.5.1 Fabricate caseworks to AWMAC custom quality grade.
- 2.5.2 Furring, blocking, nailing strips, grounds and rough bucks and sleepers.
- 2.5.2.1 S2S is acceptable for utility where concealed.
- 2.5.2.2 Board size: "Standard" or better grade.
- 2.5.2.3 Dimension sizes: "Standard" light framing or better grade.
- 2.5.3 Framing shall be of species as detailed and of AWMAC custom grade construction.
- 2.5.4 Case bodies (ends, divisions and bottoms).
- 2.5.4.1 Softwood and poplar plywood: AWMAC custom grade construction of species and thickness as detailed on drawings.
- 2.5.4.2 Hardwood plywood:
- 2.5.4.2.1 Thickness: as shown on details.
- 2.5.4.2.2 Face veneer: AWMAC custom grade construction of species as detailed on drawings.
- 2.5.4.2.3 Back veneer: AWMAC custom grade construction of species as detailed on drawings.
- 2.5.4.2.4 Bond: Type II. Must meet or exceed SCAQMD #1168.
- 2.5.4.2.5 Sanding: regular sanding as required.

- 2.5.4.2.6 Grain direction shall be as detailed.
- 2.5.4.3 Particle board: AWMAC custom grade construction of species and thickness as detailed on drawings.
- 2.5.4.4 Solid wood: AWMAC custom grade construction of species and thickness as detailed on drawings.
- 2.5.4.5 Backs:
 - 2.5.4.5.1 Softwood and poplar plywood: AWMAC custom grade construction of species and thickness as detailed on drawings.
 - 2.5.4.5.2 Hardwood:
 - 2.5.4.5.2.1 Thickness: as shown on details.
 - 2.5.4.5.2.2 Face veneer: AWMAC custom grade construction of species as detailed on drawings.
 - 2.5.4.5.2.3 Back veneer: AWMAC custom grade construction of species as detailed on drawings.
 - 2.5.4.5.2.4 Bond: Type II. Must meet or exceed SCAQMD #1168.
 - 2.5.4.5.2.5 Sanding: regular sanding as required.
 - 2.5.4.5.2.6 Grain direction shall be detailed.
 - 2.5.4.5.3 Particleboard: AWMAC custom grade of thickness as detailed on drawings.
 - 2.5.4.5.4 Hardboard: type and thickness as specified on drawings.
 - 2.5.4.5.5 Solid wood: AWMAC custom grade of species and thickness as detailed on drawings.
- 2.5.4.6 Shelving:
 - 2.5.4.6.1 Softwood and poplar plywood: AWMAC custom grade construction of species and thickness as detailed on drawings.
 - 2.5.4.6.2 Hardwood plywood:
 - 2.5.4.6.2.1 Thickness: as shown on details.
 - 2.5.4.6.2.2 Face veneer: AWMAC custom grade construction of species as detailed on drawings.
 - 2.5.4.6.2.3 Back veneer: AWMAC custom grade construction of species as detailed on drawings.
 - 2.5.4.6.2.4 Bond: Type II. Must meet or exceed SCAQMD #1168.
 - 2.5.4.6.2.5 Sanding: regular sanding as required.
 - 2.5.4.6.2.6 Grain direction shall be as detailed.
 - 2.5.4.6.3 Particleboard: AWMAC custom grade of thickness as detailed on drawings.
 - 2.5.4.6.4 Solid wood: AWMAC custom grade construction of species and thickness as detailed on drawings.
 - 2.5.4.6.5 Edge banding: provide 10 mm thick solid matching wood strip on plywood and/or particleboard edges 12 mm or thicker, exposed in final assembly. Strips same width as plywood and/or particleboard.

2.6 **Drawers**

- 2.6.1 Fabricate drawers to AWMAC custom grade supplemented as follows:

- 2.6.2 Sides and Backs:
 - 2.6.2.1 Softwood and poplar plywood: AWMAC custom grade of species and thickness as detailed on drawings.
 - 2.6.2.2 Hardwood plywood:
 - 2.6.2.2.1 Thickness: as shown on details.
 - 2.6.2.2.2 Face veneer: AWMAC custom grade construction of species as detailed on drawings.
 - 2.6.2.2.3 Back veneer: AWMAC custom grade construction of species as detailed on drawings.
 - 2.6.2.2.4 Bond: Type II. Must meet or exceed SCAQMD #1168.
 - 2.6.2.2.5 Sanding: regular sanding as required.
 - 2.6.2.2.6 Grain direction shall be as detailed.
 - 2.6.2.3 Solid wood: AWMAC custom grade of species thickness as detailed on drawings.
- 2.6.3 Bottoms:
 - 2.6.3.1 Softwood and poplar plywood: AWMAC custom grade of species and thickness as detailed on drawings. To have no added Urea Formaldehyde.
 - 2.6.3.2 Hardwood plywood: To have no added Urea Formaldehyde.
 - 2.6.3.2.1 Thickness as shown on details.
 - 2.6.3.2.2 Face veneer: AWMAC custom grade construction of species as detailed on drawings.
 - 2.6.3.2.3 Back veneer: AWMAC custom grade construction of species as detailed on drawings.
 - 2.6.3.2.4 Bond: Type II. To meet or exceed SCAQMD #1168.
 - 2.6.3.2.5 Sanding: regular sanding as required.
 - 2.6.3.2.6 Grain direction shall be as detailed.
- 2.6.3 Fronts:
 - 2.6.3.1 Softwood and poplar plywood: AWMAC custom grade of species and thickness as detailed on drawings. To have no added Urea Formaldehyde.
 - 2.6.3.2 Hardwood plywood: To have no added Urea Formaldehyde.
 - 2.6.3.2.1 Thickness: as shown on details.
 - 2.6.3.2.2 Face veneer: AWMAC custom grade construction of species as detailed on drawings.
 - 2.6.3.2.3 Back veneer: AWMAC custom grade construction of species as detailed on drawings.
 - 2.6.3.2.4 Bond: Type II. To meet or exceed SCAQMD #1168.
 - 2.6.3.2.5 Sanding: regular sanding as required.
 - 2.6.3.2.6 Grain direction shall be as detailed.
 - 2.6.3.3 Particleboard: AWMAC custom grade of thickness as detailed on drawings.
 - 2.6.3.4 Solid wood: AWMAC custom grade of species and thickness as detailed on drawings.

2.6.3.5 Laminated plastic: Refer to Section 06 24 00 - Laminated Plastic, Finish Schedule and Drawings for specifications.

2.7 Casework Doors

2.7.1 Fabricated doors to AWMAC custom grade supplemented as follows:

2.7.2 Softwood and poplar plywood: AWMAC custom grade of species and thickness as detailed on drawings. To have no added Urea Formaldehyde.

2.7.3 Hardwood plywood: To have no Urea Formaldehyde.

2.7.3.1 Thickness: as shown on details.

2.7.3.2 Face veneer: AWMAC custom grade construction of species as detailed on drawings.

2.7.3.3 Back veneer: AWMAC custom grade construction of species as detailed on drawings.

2.7.3.4 Bond: Type II.

2.7.3.5 Sanding: regular sanding as required.

2.7.3.6 Grain direction shall be as detailed.

2.7.4 Particleboard: AWMAC custom grade of thickness as detailed on drawings.

2.7.5 Hardboard: Type and thickness as specified on drawings.

2.7.6 Solid wood: AWMAC custom grade of species and thickness as detailed on drawings.

2.7.7 Laminated plastic: Refer to Section 06 24 00 Laminated Plastics, Finish Schedule and drawings for specifications

2.8 Laminated Plastic Counter Tops and Back Splashes

2.8.1 Countertops and backsplashes: one piece, factory laminated, self-edge or post formed type, as shown.

2.8.1.1 Laminated plastic: refer to finish schedule and drawings for specifications.

2.8.2 Adhesive: per manufacturer's specifications and to meet or exceed SCAQMD #1168.

2.8.3 Draw bolts: standard, as required.

2.9 Hardware

2.9.1 Refer to drawings for specifications.

2.10 Edge Banding

2.10.1 Provide 10mm thick solid matching wood strip on plywood and/or particleboard edges 12mm or thicker, exposed in final assembly. Strips same width as plywood and/or particleboard.

2.11 Fabrication

2.11.1 Set nails and countersink screws, apply stained or plain, as applicable, wood filler to indentations, sand smooth and leave ready to receive finish.

2.11.2 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.

- 2.11.3 Shelving to cabinetwork to be adjustable unless otherwise noted.
- 2.11.4 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.
- 2.11.5 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.

2.12 Finishing

- 2.12.1 Refer to Section 09 96 00 - Painting, finish Schedule and drawings for specifications.

PART 3 EXECUTION

3.1 Installation

- 3.1.1 Do architectural woodwork to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.
- 3.1.2 Install prefinished millwork at locations shown on drawings. Position accurately, level, plumb straight.
- 3.1.3 Fasten and anchor millwork securely. Provide heavy duty fixture attachments for wall mounted cabinets.
- 3.1.4 Use draw bolts in countertop joints.
- 3.1.5 Scribe and cut as required to fit abutting walls and to fit properly into recesses and to accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects.
- 3.1.6 At junction of plastic laminate counter back splash and adjacent wall finish, apply small bead of sealant.
- 3.1.7 Apply water resistant building paper over wood framing members in contact with masonry or cementitious construction.
- 3.1.8 Fit hardware accurately and securely in accordance with manufacturer's directions.

END OF SECTION

PART 1 GENERAL**1.1 Related Work**

1.1.1 Work to comply with Division 1 General Requirements.

1.1.2 Metal Stud System: Section 09 11 10.

1.1.3 Gypsum Board: Section 09 21 10.

PART 2 MATERIALS**2.1 Insulation**

2.1.1 Sound attenuation/ fibre resistant rigid insulation: non-combustible, rigid, mineral fibre board to CAS A101-M1983, thickness as indicated in widths, to suit application.

2.2 Adhesive

2.2.1 Type as recommended by manufacturer and compatible with insulation.

2.2.2 Insulation clips: impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, adhesive back, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self locking type.

PART 3 EXECUTION**3.1 Workmanship**

3.1.1 Install insulation after building substrate materials are dry.

3.1.2 Install insulation to maintain continuity of thermal protection to building elements and spaces.

3.1.3 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.

3.1.4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN4-S604 type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2 type B and L vents.

3.1.5 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.

3.1.6 Offset both vertical and horizontal joints in multiple layer applications.

3.1.7 Do not enclose insulation until it has been inspected and approved by Consultant.

END OF SECTION

PART 1 GENERAL**1.1 Related Work**

- 1.1.1 Work to comply with Division 1 General Requirements.
- 1.1.2 Metal Stud System Section 09 11 10.
- 1.1.3 Gypsum Board Section 09 21 10.

PART 2 MATERIALS**2.1 Insulation**

- 2.1.1 Sound attenuation/fire resistant batt insulation: non-combustible, semi-rigid, paperless, mineral fibre blanket to CSA A101-M1983.

2.2 Accessories

- 2.2.1 Insulation clips: supply type and size of clips to suit insulation and project requirements.
 - 2.2.1.1 Impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, adhesive back, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self locking type.
 - 2.2.1.2 Nails: galvanized steel, length to suit insulation plus [25] mm, to CSA B111.
 - 2.2.1.3 Staples: [12] mm minimum leg.
 - 2.2.1.4 Tape: as recommended by manufacturer.

PART 3 EXECUTION**3.1 Insulation Installation**

- 3.1.1 Install insulation to maintain continuity of thermal or acoustical protection to building elements and spaces.
- 3.1.2 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
- 3.1.3 Do not compress insulation to fit into spaces.
- 3.1.4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum [50] mm from sidewalls of CAN4-S604 type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2 type B and L vents.
- 3.1.5 Do not enclose insulation until it has been inspected and approved by Consultant.

END OF SECTION

1 GENERAL**1.1 SUMMARY**

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

1.2 REFERENCE STANDARDS

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

1.3 SUBMITTALS

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

1.4 QUALITY ASSURANCE

- .1 Adhere to Manufacturer's recommendations for mixing or preparation of materials listed in this Section.
- .2 Pot life or installation times shall not be exceeded.
- .3 Integral materials which compose a joint detail shall be compatible.

- .4 Component parts, where possible, shall have the same manufacturer.
- .5 A representative of sealant material manufacturer shall visit the site during application to ensure that all Work is carried out according to the manufacturer's printed instructions.

1.5 SITE CONDITIONS

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

1.6 DELIVERY, STORAGE HANDLING AND PROTECTION

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

1.7 WARRANTY

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

2 PRODUCTS

2.1 MATERIALS

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

- .1 DC CWS by Dow Corning.
 - .2 SWS by GE
 - .3 SikaSil WS-305CN by Sika OR
- .2 One component, low modulus, moisture curing, polyurethane joint sealant, conforming to ASTM C920-11, Type S, Grade NS, Class 25.
- .1 Dymonic FC by Tremco Ltd., division of RPM Company.
 - .2 Sikaflex 1A by Sika Canada Inc.
 - .3 Sonolastic NP1 by BASF.
 - .4 Pourthane NS by W.R MEADOWS
- .6 Sealant Type "B" – Expansion / Control Joints:
- .1 One-part, ultra low modulus, non-staining neutral curing 100% silicone joint sealant, conforming to ASTM C920-11, Type S, Grade NS, Class 50.
- .1 DC 790 by Dow Corning.
 - .2 Spectrem 1 by Tremco
 - .3 SCS2700 SilPruf LM by GE
 - .4 SikaSil WS-290 by Sika
- .7 Sealant Type "C" – Floor Control Joints:
- .1 Multi-component, chemical curing, self-levelling, polyurethane joint sealant, conforming to ASTM C920-11, Type M, Grade P, Class 25.
- .1 THC-900 by Tremco (Canada) Ltd., division of RPM Company.
 - .2 Sonolastic SL2 by Sonneborn Building Products, division of BASF Building Systems.
 - .3 Sikaflex 2c SL by Sika Canada Inc.
- .8 Sealant Type "E" – Mould and Mildew Resistant:
- .1 Mould and mildew resistant, Shore A Hardness 15-25, conforming to ASTM C920-11, Type S, Grade NS, Class 25, use NT, G, and A:
- .1 SCS1700 by GE
 - .2 DC 786 by Dow Corning
 - .3 Tremsil 200 by Tremco
 - .4 Omni Plus by Sonneborn
 - .5 SikaSil –GP by Sika
- .9 Sealant Type "F" – Glazing Joints:
- .1 Silicone Sealant: Butt glazing, one part, moisture curing, shore A hardness 15-25, conforming to CAN/CGSB-19.13-M, Classification C-1-40-B-N and C-1-25-B-N and ASTM C920-11, Type S, Grade NS, Class 25, use NT, G, A, O; Colour: clear (translucent):
- .1 DC 795 by Dow Corning
 - .2 SCS2000 by GE.
 - .3 Multiseal by Chemtron.
 - .4 Spectrum 2 by Tremco
 - .5 SikaSil WS-295 by Sika

- .10 Sealant Type "G" – Exterior Wall Joints:
 - .1 Air-seal sealant: One part, silicone, shore A hardness 15-25, conforming to CGSB 19-GP-13M, classification C-1-40-B-N and C-1-25-B-N and ASTM C920-11, Type S, Grade NS, Class 25. Use NT, M, G, A and O:
 - .1 DC 791 by Dow Corning
 - .2 UltraPruf II SCS 2902 by GE
 - .3 Spectrum 3 by Tremco
 - .4 SikaSil N-Plus by Sika
- .11 Sealant Type "H" – Saw Cut Sealant:
 - .1 Multi-component, self-levelling, conforming to ASTM D2240-05(2010):
 - .1 Tremco Control Joint Sealant
 - .2 BASF Masterfill 300
 - .3 Sika Loadflex
 - .4 Rezi-Weld Flex by W.R Meadows
- .12 Sealant Type "I" – HVAC Sealant:
 - .1 One-part, RTV, acetoxy-cure silicone sealant for heating, ventilation, air conditioning and refrigeration applications:
 - .1 Dow Corning HVAC Silicone Sealant
- .13 Sealant Type "J" – Electrical Sealant:
 - .1 One-part, white, non-flowing moisture cure adhesive for electrical applications:
 - .2 Dow Corning 738 Electrical Sealant
- .14 Sealant Type "K" - Interior Acoustical Sealant:
 - .1 Non-skinning, non-hardening, single component synthetic rubber sealant, conforming to CAN/CGSB-19.21-M:
 - .1 Tremco Acoustic Sealant
 - .2 Chemtron Metaseal
 - .2 Pre-compressed, self-expanding, open-cell polyurethane flexible foam acoustical joint filler.
 - .1 Willseal 150 by Tremco Ltd., division of RPM Company.
- .15 Sealant Type "L" – Smoke Sealant:
 - .1 Self-leveling, single-component silicone fire-rated sealant for sealing around wall joints and penetrations in zero hour rated wall assemblies and gaps between curtain wall and concrete.
 - .1 Dow Chemical DOWSIL Smoke Seal 800SL
 - .2 Accessories:
 - .1 Mineral wool insulation backer, with a minimum density of 96 kg/m³ and having a minimum compression of 33%.

.16 Preformed Compression Seal:

- .1 Compartmental open cell neoprene extrusion type conforming to ASTM C509-06(2011), complete with liquid lubricant adhesive recommended by manufacturer.

3 EXECUTION

3.1 INSPECTION

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

3.2 PREPARATION

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

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

3.3 APPLICATION

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

3.4 CLEANING AND PROTECTION

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

END OF SECTION

PART 1 GENERAL**1.1 Section Includes**

- 1.1.1 Prefinished aluminum door frames for interior use.
- 1.1.2 Prefinished aluminum window frames for interior use.
- 1.1.3 Prefinished aluminum framing systems for interior use.
- 1.1.4 Prefinished aluminum glass doors for interior use.
- 1.1.5 Prefinished aluminum doors for interior use.

1.2 Related Sections

- 1.2.1 Section 08 14 16 Wood doors.
- 1.2.2 Section 08 12 00 Aluminum entrances and storefront. N/A
- 1.2.3 Section 08 12 00 Aluminum windows. N/A
- 1.2.4 Section 08 71 00 Door hardware.
- 1.2.5 Section 08 80 50 Glass and glazing.

1.3 References

- 1.3.1 AAMA 603.8 –Voluntary Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum.
- 1.3.2 AA-M12-C22-A21 –Voluntary Guide Specification and Inspection Methods for Clear Anodize Finishes for Architectural Aluminum.
- 1.3.3 AA-M12-C22-A44 –Voluntary Guide Specification and Inspections Methods for Electrostatic Deposited Colour Anodic Finishes for Architectural Aluminum.

1.4 Submittals

- 1.4.1 Submit under provisions of Section 01 78 10.
- 1.4.2 Product Data: Manufacturer's fabrication and installation instructions.
- 1.4.3 Shop Drawings.
 - 1.4.3.1 Provide standard installation details for typical architectural conditions.
 - 1.4.3.2 Provide details on connections to special construction and other custom features.
- 1.4.4 Selection Samples: Provide aluminum chips in full range manufacturer's standard finishes for Interior Designer's colour selection.
- 1.4.5 Verification Samples: Provide two samples of each type of framing member required, not less than 12 inches long, in selected finish.

1.5 **Quality Assurance**

1.5.1 Manufacturer: Provide aluminum frames manufactured by a single firm specializing in production of this type of work for a minimum of five years.

1.6 **Delivery, Storage and Handling**

1.6.1 Deliver frames cartoned to provide protection during transit and storage at project site.

1.6.2 Inspect frames upon delivery for damage.

1.6.2.1 Repair minor damage to polyester finish by using air drying spray enamel of matching colour.

1.6.2.2 Replace frames that cannot be satisfactorily repaired.

1.6.3 Store frames at project site under cover and as near as possible to final installation location. Do not use covering material that will cause discoloration of aluminum finish.

1.7 **Environmental Requirements**

1.7.1 Do not begin installation of aluminum frames until area of work has been completely enclosed and interior is protected from outside elements.

1.7.2 Maintain temperature and humidity in areas of installation within reasonable limits, as close as possible to final occupancy standards. If necessary, provide artificial heating, cooling and ventilation to maintain required environmental conditions.

PART 2 **PRODUCTS****2.1** **Manufacturers**

2.1.1 Provide products manufactured by Partition Components Incorporated (PC350).

2.1.2 Substitutions: Requests for substitution and product approval in compliance with the specifications must be submitted in writing and in accordance with the procedures outlined in Division 1, Section "Substitution Procedures". Approval of requests is at the discretion of the interior designer, owner, and their designated consultants.

2.2 **Materials**

2.2.1 Interior Aluminum Partition Components Incorporated (PC350) or approved equivalent.

2.2.1.1 All sections shall be aluminum extrusions of 6063 alloy with a T5 heat treatment. Wall thicknesses shall be 3.2mm (.125") on exposed surfaces and 4.75mm (.187") on internal braces.

2.2.1.2 P2 Low Profile Swing Doors: Narrow stile door with 51 mm (2") wide stiles, 60 mm (2-3/8") top rail and 60 mm (2-3/8") bottom rail.

2.2.1.3 P5 Low Profile Swing Doors: Wide stile door with 127 mm (5") wide stiles, and 139.7 mm (5½") top and bottom rails.

2.2.1.4 SRT Low Profile Sliding Doors: Narrow stile door with 51 mm (2") wide stiles, 76.2 mm (3") top rail and 60 mm (2-3/8") bottom rail.

2.2.1.5 Elite Frames with 2" narrow profile bases.

2.2.1.6 CONSTRUCTION, HARDWARE AND GLAZING:

- 2.2.1.6.1 Door construction shall consist of butt joined corners with reinforcing at top and bottom corners consisting of an aluminum bracket not less than 4.75mm (.187") thick with a 7.5mm (.30") bolt and an aluminum retaining bracket on the inside section of the side rails. The bracket shall be welded to the top and bottom of the door stile through an access hole. All butt joints shall be welded on the concealed corners to form a true and square corner. Welds shall be of maximum penetration without weld holes or discoloration.
- 2.2.1.6.2 Hardware Note: Hardware for aluminum entrances is normally specified under "Hardware Section" of the specifications, and shall be furnished to the door manufacturer for factory installation. The hardware contractor shall furnish templates for all hardware to the door manufacturer and the hardware manufacturer shall assume responsibility for template correctness if the door manufacturer is to fabricate from supplied hardware templates.
- 2.2.1.6.3 Glazing: Door glass stops shall be square for 3/8" (10 mm) tempered glass and be dry glazed with santoprene glazing spline. Application of door stops by compression fit, wedged and hooked into rails and stiles by means of mechanical fit.
- 2.2.1.7 Aluminum: Controlled alloy billets of 6063 T5, to assure compliance with tight dimensional tolerances **and** maintain color uniformity.

2.3 Extruded Aluminum Frames

- 2.3.1 PC350 Elite – Frame System: Provide frames with the following characteristics:
- 2.3.1.1 Rectilinear design.
- 2.3.1.2 1¾ inch face profile.
- 2.3.1.3 Snap on Trim: 1¾ inch wide Aluminum.
- 2.3.1.4 Other Trim options as selected from manufacturer's catalogue.
- 2.3.1.5 0.070 inch rabbet wall thickness.
- 2.3.1.6 Throat sizes as required for partition thickness.
- 2.3.1.7 Use provided manufactures door pulls, hinges, strikes and door-sliding tracks.
- 2.3.1.8 Hardware not noted above is not supplied by PC350.

2.4 Fabrication

- 2.4.1 Pre-machine jambs and prepare for hardware, with concealed reinforcement plates, drilled and tapped as required and fastened within frame with concealed screws.
- 2.4.2 Provide corner reinforcements and alignment clips for precise butt or mitered connections.
- 2.4.3 Fabricate all components to allow secure installation without exposed fasteners.

2.5 Finishes

- 2.5.1 Factory finish extruded frame components so that any part exposed to view upon completion of installation will be uniform in finish and color.
- 2.5.2 Color anodic coating: Comply with AAMA 608.1.
- 2.5.2.1 Class 2, AAM12C22A34 color coating electrolytic deposited, 0.4-0.7 mil thickness minimum. (Clear anodized aluminum)

PART 3 EXECUTION**3.1 Examination**

- 3.1.1 Examine project conditions and verify that the work of this section may properly commence. Do not proceed with installation until unsatisfactory conditions have been corrected.
- 3.1.2 Verify wall thickness does not exceed standard tolerances allowed by specified frame throat sizes.

3.2 **Installation**

- 3.2.1 The contractor shall be responsible for installation of all materials as specified above and after installation and glazing, this contractor shall check and re-adjust, as required, all items of operating hardware installed under this section.
- 3.2.2 Comply with frame manufacturer's printed installation instructions and approved shop drawings. Strictly adhere to maintaining specified wall thickness to ensure dimension does not exceed frame throat size specified.
- 3.2.3 Install frames plumb and square, securely anchored to substrates with fasteners recommended by frame manufacturer.
- 3.2.4 Install drywall or partition components in the longest possible lengths, with no component less than 4 feet. Fasten to suspended ceiling grid at 48 inches on center maximum, using fasteners approved by frame manufacturer.
- 3.2.4.1 Use concealed installation clips to assure that splices and connections are tightly butted and properly aligned.
- 3.2.4.2 Secure clips to main structural components and not to snap-in or trim members.
- 3.2.4.3 Do not use screws or other fasteners that will be exposed to view when installation is complete.

3.3 **Adjusting and cleaning**

- 3.3.1 Clean exposed frames promptly after installation, using cleaning methods recommended by frame manufacturer.
- 3.3.2 Touch up marred areas so that touch-up is not visible from a distance of 4 feet. Remove and replace frames that cannot be satisfactorily adjusted.

3.4 **Protection**

- 3.4.1 Provide protection required to assure that frames will be without damage or deterioration upon substantial completion of the project.

3.5 **Guarantee**

- 3.5.1 The door and frame manufacturer shall guarantee the door and frame against defective material and workmanship, which shall appear within a period of two (2) years from the date of the Interior Designer's certificate of substantial completion.

END OF SECTION

PART 1 GENERAL**1.1 Related Work**

- 1.1.1 Work to comply with Division 1 General Requirements.
- 1.1.2 Rough Carpentry: Section 06 10 13
- 1.1.3 Sealants: Section 07 92 00
- 1.1.4 Steel Hollow Metal Doors: Section 08 13 13
- 1.1.5 Finish Hardware: Section 08 71 00
- 1.1.6 Glazing: Section 08 80 50
- 1.1.7 Metal Stud System: Section 09 11 10
- 1.1.8 Painting: Section 09 96 00

1.2 Qualifications

- 1.2.1 Standards: Canadian Steel Door and Frame Manufacturers' Association, "Manufacturing Standard for Doors and Frames", shall be minimum standard for work of this Section.
- 1.2.2 Steel fire rated doors and frames: listed and labelled by an organization accredited by Standards Council of Canada in conformance with CAN4 S104M-80 revised 1985 and CAN4 S105M-1985 for ratings specified or indicated.
- 1.2.3 Fabricated and install labelled steel frames, fire rated doors and frames to N.F.P.A. 80, 1975 except where specified elsewhere.

1.3 Shop Drawings

- 1.3.1 Submit shop drawings in accordance with Section 01 78 10 - Submittals.
- 1.3.2 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and finishes.
- 1.3.3 Include schedule identifying each unit with frame marks and number relating to numbering on drawings and in Door and Frame Schedule.

1.4 Schedules

- 1.4.1 Check Door Schedule and Details for door numbers, types, sizes, thickness, frame types, and all other relevant information including information for electric locks, electric strikes and magnetic locks.
- 1.4.2 Refer to Hardware Schedule for types of hardware to be installed.
- 1.4.3 Door sizes shown on Door Schedule are nominal only. Make allowances for clearances within specified standards.

1.5 **Delivery and Storage**

- 1.5.1 In addition to the requirements of Section 01 60 10, note the following:
- 1.5.1.1 Prevent rust and other damages to materials during delivery and storage, and store in dry conditions, under cover.
- 1.5.1.2 Stack on bearers, properly supported to prevent twisting, warping, and other deformations.

PART 2 **PRODUCTS****2.1** **Materials**

- 2.1.1 Steel sheet: commercial grade steel to ASTM A366-85, Class 1, finished to ASTM A526M-85, W25 wiped zinc finish.
- 2.1.1.1 Frames: 1.6 mm and 2.0 mm base thickness steel.
- 2.1.1.2 Floor anchors, channel spreaders and wall anchors: minimum 1.6 mm base thickness steel.
- 2.1.1.3 Guard boxes: minimum 0.8 mm base thickness steel.
- 2.1.1.4 Glazing stops: minimum 1.22 mm base thickness steel, tamperproof.
- 2.1.2 Reinforcing channel: to CAN3-G40.20-M81, type 300W, thickness as required unless specified.
- 2.1.3 Door bumpers: black neoprene single stud.
- 2.1.4 Primer: CGSB 1-GP-181M+Amdt-Mar-78, and CGSB 1-GP-40M.
- 2.1.5 Phosphatizing: CGSB 31-GP-105M

2.2 **Fabrication**

- 2.2.1 Fabricate frames as detailed, to Canadian Steel Door and Frame Manufacturers' Association, (CSDFMA) "Canadian Manufacturing Specifications for Steel Doors and Frames", except where specified otherwise. Reinforce frames to suit hardware requirements specified in Section 08 71 00 - Finish Hardware.
- 2.2.2 Construct in accordance with details and reviewed shop drawings, fully welded construction with no visible seams or joints on faces or vertical edges, Interlock door faces at door edge and fill and tack-weld seams.
- 2.2.3 Cut mitres and joints accurately and weld continuously on inside of frame profile.
- 2.2.4 Grind welded corners and joints to flat plane, fill with metallic paste filler and sand to uniform smooth finish.
- 2.2.5 Touch up frames with primer where galvanized finish damaged during fabrication.
- 2.2.6 Where frames terminate at floor, provide floor plates for anchorage to structural slab.
- 2.2.7 Provide three (3) stud anchors per jamb for frames to be installed in steel stud partitions.
- 2.2.8 Provide one additional anchor per jamb for each foot increase in height of door frame over seven (7) feet.
- 2.2.9 Reinforce head of frames wider than 1200 mm.
- 2.2.10 Reinforce both jambs with 100 x 40 mm galvanized structural steel channel as indicated. Install reinforcing continuous from floor to structure above.
- 2.2.11 Install three (3) bumpers on strike jamb for each single door and two (2) bumpers at head for pairs of doors.

- 2.2.12 Fabricate thermally broken frames for exterior doors using steel core, separating exterior portion of frame from interior portion with polyvinyl chloride thermal breaks.
- 2.2.13 Install 1.6 mm base thickness steel frames to interior openings 1200 mm or less in unsupported width.
- 2.2.14 Install 2.0 mm base thickness steel frames to exterior openings and interior openings over 1200 mm in unsupported width.
- 2.2.15 Prepare for security contacts and magnetic locks, where applicable.

2.3 Finishing

- 2.3.1 Fill surface depressions and butted joints with metallic paste filler and sand to uniform finish.
- 2.3.2 Wipe coated frames: touch up areas where wipe-coating has been removed, using zinc-rich paint.

PART 3 EXECUTION

3.1 Frame Installation

- 3.1.1 Set frames plumb, square, level and at correct elevation.
- 3.1.2 Secure anchorages and connections to adjacent construction.
- 3.1.3 Brace frames rigidly in position while building in. Install temporary horizontal wood spreader at three locations to maintain frame width. Provide vertical support at centre of head for openings over 1200 mm wide. Remove temporary spreaders after frames are built in.
- 3.1.4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
- 3.1.5 Prepare and clean surfaces for finishes.

3.2 Finish Hardware

- 3.2.1 Install hardware and accurately set and adjust in accordance with manufacturer's instructions and Section 08 71 00 Finish Hardware.
- 3.2.2 Obtain necessary templates for dulling, tapping, and other preparatory work necessary to accommodate hardware.
- 3.2.3 Adjust hardware for trouble-free operation to satisfaction of Owner.

END OF SECTION

PART 1 GENERAL**1.1 Related Work**

- 1.1.1 Work to comply with Division 1 General Requirements.
- 1.1.2 Installation: Section 06 20 00
- 1.1.3 Steel Hollow Metal Frames: Section 08 12 13
- 1.1.4 Finish Hardware: Section 08 71 00
- 1.1.5 Glazing: Section 08 80 50
- 1.1.6 Painting: Section 09 96 00

1.2 Qualifications

- 1.2.1 Standards: Canadian Steel Door and Frame Manufacturers' Association, "Manufacturing Standard for Doors and Frames" shall be minimum standard for work of this section.
- 1.2.2 Steel fire rated doors and frames: listed and labelled by an organization accredited by Standards council of Canada in conformance with CAN4 S104M-80 revised 1985 and CAN4 S105M-1985 for ratings specified or indicated.
- 1.2.3 Fabricate and install labelled steel fire rated doors and frames to NFPA 80-1979 except where specified otherwise.

1.3 Shop Drawings

- 1.3.1 Submit shop drawings in accordance with Section 01 30 00 - Submittals.
- 1.3.2 Indicate each type of door, material, core thicknesses, mortises, reinforcements, gauges, location of exposed fasteners, and openings.
- 1.3.3 Include schedule identifying each unit, with door marks and numbering on drawings and in door schedule.

1.4 Schedules

- 1.4.1 Check Door Schedule and Details for door numbers, types, sizes, thickness, frame types, and all other relevant information including information on electric locks (electric strikes and magnetic locks).
- 1.4.2 Refer to Hardware Schedule for types of hardware to be installed.
- 1.4.3 Door sizes shown on door schedule are nominal only. Make allowances for clearances within specified standards.

1.5 Delivery and Storage

- 1.5.1 In addition to the requirements of Section 01 60 10, note the following:
- 1.5.1.1 Prevent rust and other damages to material during delivery and storage, and store in dry conditions, under cover.
- 1.5.1.2 Stack on wood bearers, properly supported to prevent twisting, warping, and other deformations.

PART 2 PRODUCTS**2.1 Materials**

- 2.1.1 Steel sheet: 1.6 mm base thickness, commercial grade steel to ASTM A366-85, Class 1, finished to ASTM A526M-85, W25 (wiped) zinc finish.
- 2.1.2 Glazing stops: minimum 1.22 mm base thickness, W25 (wiped) zinc coated galvanized sheet steel to ASTM A525M-86, tamperproof.
- 2.1.3 Door Core:
- 2.1.3.1 Honeycomb: structural core consisting of kraft paper having 20 mm cell size to thickness indicated.
- 2.1.3.2 Hollow steel: vertically stiffened with steel ribs and all voids filled with semi-rigid fibrous insulation minimum density 24 kg/m³ polystyrene or polyurethane.
- 2.1.3.3 Bonded core: urethane or isocyanurate board insulation to CGSB 51-GP-21M-78.
- 2.1.4 Primer: for touch up to CGSB 1-GP-181M+Amdt-Mar-78 and CGSB 1-GP-40M.
- 2.1.5 Phosphatizing: CGSB 31-GP-105M.

2.2 Fabrication

- 2.2.1 Fabricate steel doors as detailed, in accordance with Canadian Steel Door and Frame Manufacturers' Association, (CSDFMA), "Canadian Manufacturing Specifications for Steel Doors and Frames", for construction, except where specified otherwise.
- 2.2.2 Construct in accordance with details and reviewed shop drawings, fully welded construction with no visible seams or joints on faces or vertical edges. Interlock door faces at door edge and fill and tack-weld seams.
- 2.2.3 Assemble interior doors with full sheets laminated to core under pressure.
- 2.2.4 Mortise, reinforce, drill and tap doors and reinforcements to receive hardware using templates provided by finish hardware supplier.
- 2.2.5 Assemble components by means of spot or arc welding.
- 2.2.6 Make provision for louvres and glazing as indicated and provide necessary glazing stops where applicable.
- 2.2.7 Close recess, greater than 19 mm in top of door with steel channel section, full depth of recess.
- 2.2.8 Construct rail and stile doors in same manner as flush doors, as applicable.
- 2.2.9 Construct matching panels in same manner as doors.
- 2.2.10 Provide 6 mm level at hinge and lock edges.
- 2.2.11 Touch up doors with primer where galvanized finish damaged during fabrication.
- 2.2.12 Prepare for security contacts and magnetic locks, where applicable.

2.3 Finishing

- 2.3.1 Fill surface depressions and butted joints with metallic paste filler and sand to a uniform smooth finish.
- 2.3.2 Wipe coated doors: touch up areas where wipe-coating has been removed, using zinc-rich paint, and apply one full coat of rust inhibitive primer.

PART 3 EXECUTION**3.1 Fitting and Hanging Doors**

- 3.1.1 Hang doors on (1½") pair of butts, unless otherwise noted, with 1.5 mm clearance at head jamb. Hang to close fully in all cases.
- 3.1.2 Prepare and clean surfaces for finishes.

3.3 Installation

- 3.3.1 Install hardware and accurately set and adjust in accordance with hardware templates and manufacturer's instructions and Section 08 71 00 - Finish Hardware.
- 3.3.2 Obtain necessary templates for drilling, tapping, and other preparatory work necessary to accommodate hardware.
- 3.3.3 Adjust hardware for trouble-free operation to the satisfaction of the Owner.

3.4 Installation

- 3.4.1 Refer to Division 6, Section 06 20 00.
- 3.4.2 Part 3.7 Installation
- 3.4.2.1 Doors and Frames
- 3.4.2.2 Finish Hardware
- Part 3.8 Mounting Heights
- Part 3.9 Field Quality Control
- Part 3.10 Adjustment

END OF SECTION

PART 1 GENERAL**1.1 Related Work**

- 1.1.1 Work to comply with Division 1 General Requirements.
- 1.1.2 Finish Carpentry: Section 06 20 00
- 1.1.3 Finish Hardware: Section 08 71 00
- 1.1.4 Painting: Section 09 96 00

1.2 References

- 1.2.1 Architectural Woodwork Manufacturers Association of Canada [AWMAC Eighth Edition - v2 - 2005]

1.3 Samples

- 1.3.1 Submit samples in accordance with Section 01 78 10 - Submittals.
- 1.3.2 Submit one 300 x 300 mm. corner sample of each type wood door.
- 1.3.3 Show door construction, core, glazing detail and faces.

1.4 Shop Drawings

- 1.4.1 Submit shop drawings in accordance with Section 01 78 10 - Submittals.
- 1.4.2 Indicate door types and cutouts.

PART 2 PRODUCTS**2.1 Materials**

- 2.1.1 Door materials: to CSA 0132.2-M1977.
- 2.1.2 Door cores and adhesives to contain no added urea formaldehyde.

2.2 Interior Flush Doors

- 2.2.1 Solid core construction:
 - 2.2.1.1 Construction: Solid particleboard door core to CSA standard 3--0188-M78;
 - 2.2.1.1.1 Density: 0.45 specific gravity, 28 lbs per square foot.
 - 2.2.1.1.2 Modulus of rupture: 400 PSI
 - 2.2.1.1.3 Elasticity: 800,000 PSI
 - 2.2.1.1.4 Internal Bond: 20 PSI
 - 2.2.1.1.5 Tolerance thickness: ± 0.005 in.
 - 2.2.1.1.6 Tolerance length/width: +0.000 in. and -0.0625 in.
 - 2.2.1.1.7 Screw holder: 90 lbs.

- 2.2.1.1.8 Water absorption: 2 hr. immersion - 40% max.
- 2.2.1.1.9 Thickness swell: 2 hr. immersion - 15% max.
- 2.2.1.1.10 Moisture content: 6% to 9%
- 2.2.1.1.11 Linear expansion: 0.35%
- 2.2.1.2 Face: wood veneer of species and thickness indicated, finish as per Door Schedule and to match Consultant's sample.
- 2.2.1.3 Grade: stain or paint as indicated on the Door Schedule and to match Consultant's sample.

2.3 Transom and Side Panels

- 2.3.1 Construction: as detailed on drawings.
- 2.3.2 Meeting edges of doors and transom panels: square and flush as detailed on drawings.
- 2.3.3 Transom frame and side panels: grain and colour to match door frames as indicated on drawings.

2.4 Fabrication

- 2.4.1 Fabricate doors and panels in accordance with CSA 0132.2-M1977.
- 2.4.2 Vertical edge strips hardwood to match face veneer minimum 13 mm thick.
- 2.4.3 Prepare doors for glazing, as required. Stops to match face veneer.
- 2.4.4 Bevel vertical edges of single acting doors 3 mm in 50 mm on lock side and 1.5 mm in 50 mm on hinge side.
- 2.4.5 Provide waterproof non-staining membrane at cutouts on high humidity area doors to exclude moisture from core.

PART 3 EXECUTION

3.1 Installation

- 3.1.1 Install doors and hardware in accordance with templates and manufacturer's printed instructions, and Section 08 71 00 - Finish Hardware.
- 3.1.2 Adjust hardware for correct function and trouble-free operation to the satisfaction of Owner.
- 3.1.3 Install all stops and spot type neoprene softener (min. 3 per door)
- 3.1.4 Secure transom and side panels by means of concealed fasteners or countersunk screws concealed by means of wood plugs matching panel in grain and colour.

3.2 Adjustment

- 3.2.1 Re-adjust doors and hardware just prior to completion of building to function freely and properly.

END OF SECTION

Specifications for two (2) revolving door entrance vendors follow. Provide separate prices for comparison as well as acceptable equivalents. We reserve the right to select from either of the two proposed vendors.

PART I – GENERAL**1.1 SECTION INCLUDES**

This section covers the furnishing and installation of a Full-height turnstile for pedestrian access control.

1.2 REFERENCES

- A. The security revolving door must be evaluated and approved per CAN / CSA requirements contained in SPE-1000, Model Code for the Field Evaluation of Electrical Equipment.

1.3 SYSTEM REQUIREMENTS

- A. The security revolving door must control and be able to restrict pedestrian traffic between unsecured and secured areas.
- B. Must feature normally closed full-height rotating obstacle to securely block the pedestrian's path and prevent access in restricted areas without authorization.
- C. The motorized door must be activated via an access control devise (radar, push button, card reader...) and bidirectional, allowing traffic in both directions. Both directions must be configurable in one of two (2) states:
 - 1. Free: all persons are authorized to pass under all conditions, providing that the user used a push button or there a radar to trigger the door rotation.
 - 2. Controlled: each person must present a valid means of authentication to the reader before being authorized to pass.
- D. Must allow possibility to use the access control system to grant or deny access to the facility and operate with a variety of user authentication devices such as card reader devices, ticketing systems or barcode reader systems.
- E. Must be designed to guarantee user safety and ease of passage.
- F. Design of the unit must have a provision for optional visual and audible notifications for intuitive process.

1.4 SUBMITTALS

- A. Submit product data: equipment description, dimensions, electrical wiring diagrams for installation, and manufacturer's technical manuals on each product to be used, including:
 - 1. Preparation instructions and recommendations,
 - 2. Storage and handling requirements and recommendations,
 - 3. Installation methods,
 - 4. Operation and maintenance manuals.
- B. Provide shop drawings and indicate component connections anchoring methods and installation details.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver equipment to job site in manufacturer's packaging, undamaged and with complete installation instructions.
- B. Store indoors in a controlled environment, protected from dust, construction activities and debris.

1.6 PROJECT/SITE CONDITIONS

- A. Install security revolving door on leveled, finished floor.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Manufacturer must be a company specializing in designing and manufacturing of round automatic security booths with proven experience.
- B. Source Limitations: obtain the Security Revolving Doors from Automatic Systems.

1.8 WARRANTY

- A. Automatic Systems warranties its products against parts defects for a period of two (2) year from the date of invoicing. This warranty excludes glass damages and normal wear on finish or damage that occurs due to abuse or misuse. Obtain full warranty terms from Automatic Systems.
- B. Manufacturer shall have in place a dispatch procedure that shall be available 24 hours a Day, 7 Days a week for emergency call back service.
- C. Include for a five (5) year maintenance and service agreement. Manufacturer shall respond to all service calls within 24 hours from time of call.
- D. Provide one (1) additional Microprocessor-based controller to client, which client will store on site for future use.

PART II – PRODUCTS**2.1 MANUFACTURERS**

- A. Manufacturers: subject to compliance with requirements, provide products by the following:
 1. AUTOMATIC SYSTEMS AMERICA INC, 4005 Matte Boulevard, Unit D, Brossard, Quebec, J4Y 2P4, CANADA
Phone : 800 263 6548
Fax : 450 659 0966
Home page : www.automatic-systems.com E-mail : sales@automatic-systems.com

2.2 PRODUCTS

- A. Security Revolving Door, Model RevLock 603T.

2.3 CONSTRUCTION

- A. Frames
 1. Steel structure painted non-standard RAL colour (textured finish). RAL colour to match PC350's Graphite finish. Provide custom RAL samples for designer selection and approval prior to fabrication.
- B. Top mechanical housing
 1. Steel structure painted non-standard RAL colour (textured finish). RAL colour to match PC350's Graphite finish. Provide custom RAL samples for designer selection and approval prior to fabrication.
- C. Side panels
 1. Four (4) laminated glass side panels
 - a. Laminated glass BR2/S P6B (Standard)
- D. Revolving obstacles
 1. RL 603T: four (4) mobile obstacles
- E. Enclosure
 1. Design of the unit's enclosure must insure an IP 33 degree of protection (with the optional canopy).

2.4 DIMENSIONS

- A. Free passage
 - Width **RL 603T** : 47 ½" (1206 mm)
 - Internal height **RL 603T**: 90 9/16" (2300 mm)

- B. Dimensions
 - Diameter **RL 603T**: 76" (1930 mm)
 - Height maximum **RL 603T**: Custom canopy to underside of ceiling at +/-107" (2720 mm)

2.5 OPERATION

- A. The unit must be motorized in both directions
- B. Normal Operation (available for "Controlled" operating mode)
 1. In stand-by position, the passageway must be securely blocked by means of a mechanically locked revolving obstacle,
 2. Upon receipt of an opening pulse from the access control system, the mechanism must unlock; the revolving obstacles rotate counter clockwise,
 3. The obstacles automatically lock themselves after the user has exited,
 4. In case of detection of an un-authorized person or the presence of a non-authorized person or the presence of more than one user, the obstacles stop and rotate clockwise to evacuate the user(s) and a warning message will be aired.
- C. Emergency Operation
 1. The unit must have an input in order to receive the "fire alarm" signal. When the emergency situation is activated, the unit must react in the following way: the revolving obstacle is unlocked and can manually be rotate to allow easier exit,
 2. This operating mode continues as long as the emergency signal is active,
 3. After the emergency signal has been turned off, the unit must return to its previous operating mode.
- D. Power failure
 1. In case of power failure, a battery back-up keeps the unit running for about 100 cycles.
 2. After full discharge of the battery, the revolving obstacles unlock.
 3. After the power supply has been restored, the unit must return to its previous operating mode.

2.6 SECURITY

- A. Must provide four (4) full-height laminated glass revolving obstacles to securely block the passageway and ensure single-user throughput.
- B. Must have an integrated mechanical locking device. The obstacles must be mechanically blocked in the rest position to prevent any attempted break-in.
- C. Must be equipped with a self-centering mechanism to ensure that rotating obstacles return to the reset position after passage

2.7 SAFETY AND ERGONOMICS

- A. Must have four (4) rotating obstacles spaced 90° apart to allow comfort and ease of passage.
- B. Must be equipped with anti-pinch sensor to ensure user's safety.
- C. The control panel must be equipped with an emergency mode.

2.8 PEDESTRIAN GUIDANCE

- A. Visual notification with clear graphics must be incorporated into each passageway (one for each direction) to provide status of the lane, to control flow and to warn users.
- B. Passageway must be illuminated by LED integrated lighting to improve user comfort and safety.

2.9 CONTROLLER

- A. Microprocessor-based controller with the following characteristics:
 - 1. RAM & ROM memory,
 - 2. RS485 communication interface
 - 3. A control panel (PC connection):
 - a. to configure user modes,
 - b. to configure advanced parameters,
 - c. to troubleshoot and rapidly detect the source of problem.
 - 4. LED indicators showing the status of the inputs and outputs.

2.10 POWER SUPPLY

- A. Power supply: 120 Volts AC 60 Hz.
- B. Consumption in operation: 200 W (maximum).

2.11 PERFORMANCE

- A. MCBF: 2 000 000: average number of cycles between breakdowns, when respecting manufacturer's recommended maintenance.
- B. Operating Temperatures: 14° to +131°F (-10° to +55°C)

2.12 OPTIONS

- 1. Uniqueness detector (both directions) by time of flight camera (RL 603T)
- 2. Custom canopy to underside of ceiling at +/-107" (2720 mm)
- 3. Steel structure painted non-standard RAL colour (textured finish). RAL colour to match PC350's Graphite finish. Provide custom RAL samples for designer selection and approval prior to fabrication.

PART III – EXECUTION**3.01 INSPECTION**

- A. Installer must examine the installation location and advise the Contractor of any site conditions inconsistent with proper installation of the product. These conditions include but are not limited to the following:
 - 1. Security revolving door must be installed on a level concrete pad,
 - 2. The floor must be completely finished before the unit is installed,
 - 3. Power supply and control wiring must be installed following manufacturer's recommendations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

SCHEDULE 0 – INSTALLATION

- A. Install the security revolving door in strict accordance with manufacturer's instructions. Units must be level. Anchor securely into place.

3.02 ADJUSTMENT

- A. Installer must adjust the security revolving door for proper performance after installation.

3.03 INSTRUCTION

- A. A factory trained installer must demonstrate to the owner's maintenance crew the proper operation and the necessary service requirements of the equipment, including exterior maintenance.

3.04 CLEANING

- A. Clean the security revolving door and area carefully after installation to remove excess caulk, dirt and labels.

3.05 MAINTENANCE

- A. Maintain the equipment according to the manufacturer's instructions.

END OF SECTION

PART 1 - GENERAL**1.1 SUMMARY**

- A. This section includes the following types of revolving entrance doors:
 - 1. Four wing access control revolving door including enclosure walls and canopy.
- B. Related Sections:
 - 1. Division 7 Sections for caulking to the extent not specified in this section.
 - 2. Division 8 Section "Aluminum-Framed Entrances and Storefronts" for entrances furnished separately in Division 8 Section.
 - 3. Division 8 Section "Door Hardware" for hardware to the extent not specified in this Section.
 - 4. Division 8 Section "Glazing" for materials and installation requirements of glazing.
 - 5. Division 26 Sections for electrical connections including conduit and wiring for revolving door entrance operators and lighting.
 - 6. Division 28 Sections for access control devices.

1.2 REFERENCES

- A. References: Refer to the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 101 - Life Safety Code.
- B. American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA).
 - 1. ANSI/BHMA A156.27 American National Standard for Power and Manual Operated Revolving Pedestrian Doors.
 - 2. ANSI Z97.1 Standards for Safety Glazing Material Used in Buildings.
- C. American Society for Testing and Materials (ASTM).
 - 1. ASTM B221 Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
 - 2. ASTM B209 Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.
- D. American Architectural Manufacturers Association (AAMA).
 - 1. AAMA 611 Voluntary Specification for Anodized Architectural Aluminum.
- E. National Association of Architectural Metal Manufacturers (NAAMM).
 - 1. Metal Finishes Manual for Architectural Metal Products.
- F. International Code Council (ICC).
 - 1. IBC: International Building Code Building Code.

1.3 DEFINITIONS

- A. Activation Device: Device that, when actuated, sends an electrical signal to the door operator to activate the operation of the door.
- B. Safety Device: A device that detects the presence of an object or person within a zone where contact could occur and provides a signal to stop the movement of the door.

1.4 PERFORMANCE REQUIREMENTS

- A. Compliance with the following:
 - 1. ANSI/BHMA A156.27 American National Standard for Power and Manual Operated Revolving Pedestrian Doors.
- B. Thermal Movements: Provide revolving entrance doors that allow for thermal movements resulting from maximum change in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
- C. Operating Temperature Range: -22° F to 130° F (-29° C to 54° C).
- D. Emergency Exit door requirements: Comply with requirements of authorities having jurisdiction for revolving entrance doors serving as a required means of egress.
- E. Breakout Force Requirements:
 - 1. Revolving doors shall be provided with a mechanism that allows emergency breakout of door panels when a maximum force of 130 lbs (570 N) applied 3 inches (75 mm) from the outer edge of the door panel and 40 inches (1020 mm) above the floor, unless otherwise allowed by ANSI/BHMA A156.27.
- F. Revolving door entrances shall have a mechanism that controls the speed of the rotating door panels to the maximum allowable revolutions per minute (RPM) as specified by ANSI/BHMA A156.27.

1.5 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, fabrication, operational descriptions and finishes.
- B. Shop Drawings: Submit manufacturer's shop drawings, including elevations, sections and details, indicating dimensions, materials, and fabrication of doors, enclosure wall, canopy, operator, activation sensors, safety sensors, anchors, hardware, finish, options and accessories.
- C. Samples: Submit manufacturer's samples of aluminum finish.
- D. Informational Submittals: Manufacturer's product information and applicable sustainability program credits that are available to contribute towards a LEED rated project certification.
 - 1. Credit MR 4.1 and 4.2: Manufacturer's or fabricator's certificate indicating percentage of post-consumer recycled content by weight and pre-consumer recycled content by weight for each Product specified under this Section.
- E. Manufacturers Field Reports: Submit manufacturer's field reports from AAADM certified technician of inspection and approval of doors for compliance with ANSI/BHMA A156.27 after completion of installation.
- F. Operating and Maintenance Manuals: Provide manufacturer's operating and maintenance manuals for each item comprising the complete door opening installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the entrance and their nearest service representatives. The final copies delivered after completion of the installation test to include spare parts list.
- G. Warranties and Maintenance: Special warranties and maintenance agreements specified in this Section.

1.6 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage a qualified manufacturer with a minimum of ten (10) years of documented experience in manufacturing revolving door systems similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Installer Qualifications: Installers, trained by the primary product manufacturers, with a minimum three (3) years documented experience installing and maintenance of units similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Certified Inspector Qualifications: Certified by AAADM.
- D. Source Limitations for Revolving Door Entrances: Obtain each type of door, frame, operator and sensor components specified in this Section from a single source, same manufacturer unless otherwise indicated.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings to receive revolving door entrances by field measurements before fabrication and indicate on shop drawings.

1.8 COORDINATION

- A. Coordinate sizes and locations of recesses in concrete floors for recessed tracks and thresholds if applicable. Concrete work is specified in Division 03.
- B. Electrical System Roughing-in: Coordinate layout and installation of revolving door entrances with connections to the electrical systems including fire detection and access control systems as applicable.

1.9 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Revolving Door Entrances shall be free of defects in material and workmanship for a period of two (2) years from the date of substantial completion.
- C. During the warranty period a factory-trained technician shall perform service and affect repairs. An inspection shall be performed after each adjustment or repair.
- D. During the warranty period all warranty work, including but not limited to emergency service, shall be performed during normal business hours.
- E. Manufacturer shall have in place a dispatch procedure that shall be available 24 hours a Day, 7 Days a week for emergency call back service.
- F. Include for a five (5) year maintenance and service agreement. Manufacturer shall respond to all service calls within 24 hours from time of call.
- G. Provide one (1) additional Micro-processor Control Unit (MCU) to client, which client will store on site for future use.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Manufacturer: ASSA ABLOY Entrance Systems, Website www.assaabloyentrance.ca contact: darren.noble@assaabloy.com

- B. Substitutions: Requests for substitution and product approval in compliance with the specifications must be submitted in writing and in accordance with the procedures outlined in Division 1, Section "Substitution Procedures". Approval of requests is at the discretion of the interior designer, owner, and their designated consultants.

2.2 REVOLVING DOOR ENTRANCES

- A. Revolving door entrances including the following:

1. Aluminum framed glass revolving doors.
2. Radiused enclosure walls.
3. Entrance canopy and roof.
4. Overhead concealed electro-mechanical operator.
5. Microprocessor controlled revolving door control system.
6. Controls and accessories as required for a complete installation.

- B. ASSA ABLOY RD4A-2 two way access control, revolving door entrances. (Basis of Design):

1. Four wing automatic revolving door.
2. The nominal inside diameter of the revolving door entrance shall be as indicated.
 - a. 6' diameter.
3. Rotation: Counterclockwise rotation.
4. Emergency escape doors.
 - a. Configuration: Center shaft revolving door with four double acting panels.
 - b. Emergency Breakaway Capability: Door panels shall breakout in the direction of egress.
5. Security-Type Operation: Activation of the revolving door entrance by access control device and sensors to control unauthorized use.
 - a. Two way access control to allow both controlled entrance and controlled egress.
 - b. Anti-Tailgating: Overhead sensors to detect an unauthorized user attempting passage in a separate quadrant as an authorized user enters.
 - c. Anti-Tailgating/Anti-Piggybacking: SPT360 Anti-Tailgate/Anti-Piggyback sensor system to detect person attempting passage in a separate quadrant as an authorized user enters or two people attempting passage in the same quadrant.

2.3 REVOLVING DOOR ENTRANCE COMPONENTS

- A. Access Control Revolving Door Entrances:

1. Circular Enclosure Walls and Canopy: Slim line aluminum extrusion framing with a minimum wall thickness of 0.125 inches. Framing for the enclosure walls and canopy shall be formed to the required radius. All internal structural support shall be slim line aluminum construction.
 - a. Segmented walls and canopy shall not be allowed.
 - b. Metal-wrapped wood substrate or other metal-wrapped material substrates shall not be allowed.
2. Rotating Wings: Aluminum extrusion framed glass panels.
3. Center Post: Extruded aluminum, finished to match door wings.
4. Emergency Escape Doors: Doors in rotating wings shall be as follows:
 - a. Four (4) double acting swing door panels.
 - b. Door wings shall have electro-magnetic locking that hold the door panels in a closed position.
5. Weather Stripping: Natural horsehair and synthetic fiber brush shall provide continuous horizontal and vertical seals during both the rotating mode and the non-rotating closed position to insure limited air infiltration.

6. Canopy: Manufacturer's standard canopy construction, size and layout matching diameter of enclosure walls, with formed metal panel sides of material and finish matching enclosure walls, unless otherwise indicated.
 - a. The roof structure of the canopy shall be 5/8" laminated wood covered by a waterproof EPDM membrane, and shall include a water diversion system to drain roof water.
 - b. Aluminum sheet roof, finish as indicated.
7. Rotating Ceiling: 5/8" laminate faced insulation board.
 - a. Ceiling panels must be removable and serve as access hatches.
8. Ceiling Lights: 5 watt, 3000K LED MR16 lamp, 12VAC/DC. Flush mounted ceiling light fixtures in quantity as indicated. (203-220VAC, AC light fixtures shall not be acceptable).
 - a. Light activation control via the program selection switch or from optional remote location.
 - b. Six (6) LED light fixtures.
9. Glass: Glazing shall comply with ANSI Z97.1, thickness as indicated.
 - a. Rotating section and double acting swing doors shall be 1/4" (6 mm) clear laminated glass.
 - b. Curved walls and curved rotating doors shall be 7/16" (11 mm) clear laminated glass formed to the required radius to assure a weather seal throughout enclosure.
 - 1) Flat glass and segmented glass shall not be accepted in the radiused enclosure walls.
 - 2) Butt glazed panels shall not be acceptable.
 - 3) Plastic glazing material shall not be acceptable.

2.4 REVOLVING DOOR OPERATOR AND CONTROLS

- A. Controls must be microprocessor based "plug-in type" electronics (hard wired systems are not acceptable) with self-diagnostics and digital display status indicator. Digital display status indicator must be located on the interior left of the curved outside wall system. System must be capable of providing information indicating door status, source or probable cause plus remedy.
- B. Access Control Revolving Door Entrances:
 1. Drive Assembly: Center shaft driven by a worm gear reducer with one 1/4 HP DC permanent magnet motor. The drive assembly allows manual rotation, when there is no power to the motor for fail safe operation. Drive assembly shall not permit door speed to be over ridden beyond the set operational speed.
 - a. Power Requirements - shall be (1) 110-220 VAC, 20 Amp, 60HZ line.
 - b. UPS battery backup to provide continuous power to the SPT360 Anti-Tailgate/Anti-Piggyback sensor system.
 - 1) Power Requirements - shall be (1) 110 VAC, 20 Amp, 60HZ line.
 2. Self-Monitoring Function: Supervision of all systems must be performed by the Micro-processor Control Unit (MCU) by conducting "self-monitoring" continuously. Malfunction of any device shall cause the door to stop and the error code shall be indicated on the diagnostic display of the Micro-processor Control Unit MCU.
 - a. Doors without the "self-monitoring function" will be considered unsafe and will not be acceptable.
 3. Program Control Device (PCD):
 - a. Provide one (1) program control device (PCD) on the interior left vertical jamb of the curved wall. PCD shall provide seven (7) functions including locked in closed position, entry/exit with activation by access control device (one-way or two-way operation as specified), free entry/free exit, no entry/free exit, manual operation (forward/reverse).
 - b. The PCD utilizes entry code access and does not require key operation during normal use of the door system.

- c. The buffer memory is a function of the microprocessor that records the last 600 operational events of the door system.
- d. The PCD provides visual displays to notify the user of operational codes.
- e. The real time clock is programmable for 3 different day schedules, 10 different operation modes per day schedule, weekly schedules and up to 16 exceptions for holidays.

2.5 ACTIVATION AND SAFETY CONTROL DEVICES

A. Access Control Revolving Door Entrances:

1. Activation Units:

- a. Revolving door shall be activated by access control devices allowing the following type of operation (access control devices by others):
 - 1) Two-way access control operation: access controlled entry and exit (two access control devices required).
 - 2) Refer to Program Control Device (PCD) for other modes of operation not controlled by the access control device(s).
- b. Automatic Operation: Signal from the access control device activates the unit and revolves the door up to one turn, and then returns door wings to home position.

2. Safety Control Devices:

- a. Provide primary and/or secondary safety devices located vertically at the entrances and force-sensitive door leaves. All devices shall be incorporated as follows:
 - 1) Vertical Safety Sensors:
 - a) Two (2) total compressible safety switches on the outer drum wall entrances. Activation shall cause the door to stop and reverse.
 - 2) Force-Sensitive Door Leaves:
 - a) When an obstacle prohibits or slows rotation of the door, (at a value higher than the pre-set resistance of the door) rotation will stall and cease for 3 seconds. If no obstacle is detected after 3 seconds, the rotation of the door will resume.
 - 3) Emergency Stop:
 - a) The revolving door shall include one (1) emergency stop push button. When the button is pressed, the rotation shall stop.
 - 4) Slow Speed Push Plates:
 - a) The revolving door shall include two (2) handicapped "push to slow" push plates. When the push plate is pressed, the rotation speed will be reduced.

3. Emergency Escape Operation:

- a. Loss of power and/or fire alarm input will initiate the release of the electro-magnetic lock allowing for the door panels to be manually pushed to the emergency egress position.

4. Monitoring Sensors:

- a. Anti-Tailgating/Anti-Piggybacking: SPT360 Anti-Tailgate/Anti-Piggyback sensor system monitors passage of authorized users. The SPT360 sensor system will detect person attempting passage in a separate quadrant as an authorized user enters or two people attempting passage in the same quadrant. If a suspicious activity is detected, the door will stop revolving thus preventing entry of unauthorized users and a voice annunciator will announce "security violation".

- b. Overhead monitoring sensors shall be located in the ceiling of secure compartments.

2.6 HARDWARE

A. Access Control Revolving Door Entrances:

1. Locking System:

- a. The revolving door will automatically cycle and rest in the full closed and locked position when the selector switch is placed in the "off" position.
- b. Locking of the revolving door entrance is by an internal electro-mechanical lock.
 - 1) The electro-mechanical lock must be completely automatic and must be controlled through the selector switch.

2.7 ALUMINUM FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Curved Enclosure Finish:

1. Painted Finish:

- a. Powder coat painted to match PC350's Graphite finish. Provide custom RAL samples for designer selection and approval prior to fabrication.

C. Rotating Enclosure Finish:

1. Painted Finish:

- a. Powder coat painted to match PC350's Graphite finish. Provide custom RAL samples for designer selection and approval prior to fabrication.

2.8 CEILING FINISH

A. Ceiling Panel Finish:

1. White laminate faced insulation board.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the opening to receive the revolving door entrance with the Installer present, for compliance with requirements for installation tolerances, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical source power to verify actual locations of wiring connections.
- C. Proceed only after such discrepancies or conflicts have been resolved.

3.2 INSTALLATION

- A. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure non-movement joints. Seal joints watertight.
- B. Entrances: Install revolving door entrances plumb and true in alignment with established lines and grades without warp or rack of framing members and doors. Anchor securely in place.
 1. Install revolving door entrances in accordance with manufacturer's printed instructions and recommendations.

2. Install surface mounted hardware using concealed fasteners to greatest extent possible.
 3. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the assembly to exterior.
- C. Door Operators: Connect door operators and lighting to electrical power distribution system as specified in Division 26 Sections.
1. Connect to access control systems as specified in Division 28 Sections.
- D. Glazing: Glaze revolving door entrances in accordance with the Glass Association of North America (GANA) Glazing Manual, published recommendations of glass product manufacturer, and published instructions of automatic entrance system manufacturer.
- E. Sealants: Comply with requirements specified in division 7 Section "Joint Sealants" to provide a weather tight installation.
1. Set sill members, flashings, and framing members in full bed of sealant.
 2. Seal perimeter of framing members with sealant.
- F. Signage: Apply signage on both sides of each door as required by ANSI/BHMA A156.27 and manufacturer's installation instructions.

3.3 ADJUSTING

- A. Adjust door operators, controls and hardware for smooth and safe operation and for weather tight closure. Adjust doors in compliance with ANSI/BHMA A156.27.

3.4 FIELD QUALITY CONTROL

- A. Before placing doors into operation, AAADM certified technician shall inspect and approve doors for compliance with ANSI/BHMA A156.27. Certified technician shall be approved by the manufacturer.

3.5 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door installation.
- B. Clean glass and metal surfaces promptly after installation. Remove excess sealants, compounds, dirt and other substances. Repair damages to match original finish.

3.6 DEMONSTRATION

- A. Engage a factory-authorized representative to train Owner's maintenance personnel to adjust, operate, and maintain safe operation of the revolving door entrance.

END OF SECTION

- 2.1.4 Full width header to accommodate electromagnetic devices on entrance doors where required.
- 2.1.5 Header extrusion on entrance doors, where exposed, to be finished to match rails.
- 2.1.6 Door pulls to be supplied by Section 08 71 00. Coordinate for drilling glass doors.
- 2.1.7 Custom cover for electric mag lock by this Division as described on the details and schedules.

3 EXECUTION

3.1 Inspection

- 3.1.1 Examine the areas which are to receive the work of this section, and proceed only when conditions are satisfactory.

3.2 Preparation

- 3.2.1 Site measure prior to fabrication

3.3 Installation

- 3.3.1 Refer to Door Schedule and Finishes Specifications for location, type, size and finish of doors.
- 3.3.2 Install glass and door systems in accordance with manufacturer's recommendations.
- 3.3.3 Install all work plumb, level and rigid. Allow for deflection where applicable.
- 3.3.4 Coordinate sequencing of installation with other trades.
- 3.3.5 Coordinate sub-floor steel bracing with fabricated Metals trade at all pivot glass door locations, to ensure adequately stable mounting conditions.

3.4 Adjusting and Cleaning

- 3.4.1 Adjust all hardware for proper clearance and operation of operable units.
- 3.4.2 Remove all protective coatings.
- 3.4.3 Clean and polish all glass at completion of work.

END OF SECTION

PART 1 GENERAL**1.1 Related Work**

1.1.1 Work to comply with Division 1 General Requirements.

1.1.2 Supply and installation of hardware for:

1.1.2.1 Wood Doors: Section 08 14 16

1.1.2.2 Cabinetwork and shelves: Section 06 41 11

1.2 Reference Standards

1.2.1 Standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturers' Association.

1.3 Requirements of Regulatory Agencies

1.3.1 All hardware shall comply with applicable fire and building codes.

1.4 Samples

1.4.1 Submit samples of each type hardware specified, in accordance with Section 01 78 10.

1.4.2 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.

1.5 Hardware List

1.5.1 Submit hardware schedule in accordance with Section 01 78 10.

1.5.2 Indicate hardware proposed, including make, model, material, function, finish and other pertinent information including delivery time or date.

1.5.3 Provide 6 copies of hardware specification for field and construction use.

1.6 Maintenance Data

1.6.1 Provide maintenance data, parts list, and manufacturer's instructions for each type door closers, locksets, door holders and fire exit hardware for incorporation into maintenance manual specified in Section 01 78 10.

1.6.2 Brief maintenance staff regarding proper care, cleaning, and general maintenance.

1.7 Maintenance Materials

1.7.1 Supply two sets of wrenches for door closers, locksets and fire exit hardware.

1.8 Delivery and Storage

1.8.1 Store finishing hardware in locked, clean and dry area. Damaged hardware must be replaced.

1.8.2 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.

1.8.3 Maintain inventory list with hardware schedule.

1.9 Warranty

1.9.1 Provide written warranty on all hardware components for period of two (2) years with the exception of closers which will be five (5) years.

PART 2 PRODUCTS

2.1 Hardware Items

2.1.1 Use one manufacturer's products only for all similar items.

2.1.2 Supply all items scheduled on the drawings complete with adequate fixing and anchoring devices.

2.1.3 Blank strikes – see door schedule.

2.1.4 Lock strikes – see door schedule.

2.1.5 Deadlock strikes – see door schedule.

2.1.6 All door closures shall be non-sized and where possible non-handed. They shall be sized and adjusted by the installer to suit application requirements.

2.1.7 All hardware to be delivered when required, packed separately and each item properly labelled with room or door number, for which it is required.

2.1.8 Hardware schedule shall correspond with the markings on the hardware items.

2.1.9 Soft close required for all drawers and cabinets. Refer to drawings for specifications.

2.2 Fastenings

2.2.1 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.

2.2.2 Exposed fastening devices to match finish of hardware.

2.2.3 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.

2.2.4 Use fasteners compatible with material through which they pass.

2.3 Keying

2.3.1 All locksets to be master keyed and construction keyed to match existing base building system.

2.3.2 Provide keys in duplicate for every lock in this Contract.

2.3.3 Stamp keying code numbers on keys and cylinders.

PART 3 EXECUTION**3.1 Installation Instructions**

- 3.1.1 Furnish metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.
- 3.1.2 Furnish manufacturers' instructions for proper installation of each hardware component.
- 3.1.3 Install hardware to standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturers' Association.
- 3.1.4 Where door stop contacts door pulls, mount stop to strike bottom of pull.

END OF SECTION

PART 1 GENERAL**1.1 Related Work**

- 1.1.1 Work to comply with Division 1 General Requirements.
- 1.1.2 Cabinetwork and shelves: Section 06 20 00 - Finish Carpentry.
- 1.1.3 Cabinetwork and shelves: Section 06 41 11 - Architectural Woodwork.

1.2 Reference Standards

- 1.2.1 CAN/CGSB-69.25-(M90)/ANSI/BHMA A156.9-1982 Cabinet Hardware.
- 1.2.2 CAN/CGSB-69.27-(M90)/ANSI/BHMA A156.11-1985, Cabinet Locks.
- 1.2.3 CAN/CGSB-69.32-(M90)/ANSI/BHMA A156.16-1981, Auxiliary Hardware.
- 1.2.4 CAN/CGSB-69.34-(M90)/ANSI/BHMA A156.18-1984, Materials and Finishes.
- 1.2.5 CAN/CGSB-69.36-(M90)/ANSI/BHMA A156.20-1984, Strap and Tee Hinges and Hasps.

1.3 Samples

- 1.3.1 Submit samples in accordance with Section 01 78 10.

1.4 Hardware List

- 1.4.1 Submit cabinet hardware list in accordance with Section 01 78 10 - Shop Drawings, Product Data, Samples and Mock-ups.
- 1.4.2 Indicate specified hardware, including make, model, material, function, finish and other pertinent information.

1.5 Maintenance Data

- 1.5.1 Provide maintenance data, parts list, and manufacturer's instructions.

1.6 Delivery and Storage

- 1.6.1 Store cabinet hardware in locked, clean and dry area.
- 1.6.2 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.

PART 2 PRODUCTS**2.1 Hardware Items: Product shall consist, but shall not be limited to, the following items**

- 2.1.1 Use one manufacturer's product for all similar items.
- 2.1.2 Refer to Millwork Drawings for Specifications.

2.2 **Cabinet Hardware**

2.2.1 Cabinet hardware: to CAN/CGSB-69.25. The Contractor shall be responsible for determining all hardware as required to complete the Work and coordinating supply and installation under this division.

2.2.2 Where no specified product has been indicated in the documents, the Contractor shall supply hardware of first rate quality from premium lines, by nationally recognized manufacturers.

2.2.3 Cylinders: key into keying system (as noted) (as directed).

2.2.4 Finished as indicated on details or schedules.

2.3 **Miscellaneous Hardware**

2.3.1 Auxiliary hardware: to CAN/CGSB-69.32.

2.3.2 Strap and tee hinges and hasps: to CAN/CGSB-69.36.

2.4 **Fastenings**

2.4.1 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.

2.4.2 Exposed fastening devices to match finish of hardware.

2.4.3 Use fasteners compatible with material through which key pass.

2.5 **Keying**

2.5.1 N/A

PART 3 **EXECUTION****3.1** **Installation Instructions**

3.1.1 Furnish manufacturers' instruction for proper installation of each hardware component.

3.1.2 Key control: Test all keys to ensure lock and key work. Coordinate turnover procedure of keys with the owner.

END OF SECTION

PART 1 GENERAL**1.1 Section Includes**

1.1.1 Glass and glazing.

1.2 Related Sections

1.2.1 Section 01 00 10 – General Conditions

1.2.2 Section 07 92 00 – Sealants

1.2.3 Section 08 12 00 – Interior Aluminum Door & Glazing Frames

1.2.4 Section 08 42 33 – Revolving Door Entrances

1.2.5 Section 08 45 00 – Glass Entrances

1.2.6 Section 08 71 00 – Finish Hardware

1.2.7 Section 09 11 10 – Metal Stud System

1.2.8 Section 09 21 10 – Gypsum Board

1.3 References

1.3.1 CAN/CGSB-12.1 – Safety Glazing.

1.3.2 CAN/CGSB-12.3 – Flat, Clear Float Glass.

1.3.4 CAN/CGSB-12.11 – Wired Safety Glass.

1.3.5 GANA (Glass Association of North America) – Glazing Manual.

1.3.6 GANA (Glass Association of North America) – Sealant Manual.

1.3.7 GANA (Glass Association of North America) – Laminated Glass Design Guide.

1.4 Performance Requirements

1.4.1 Provide glass and glazing materials for continuity of space enclosure: In conjunction with materials described in other sections.

1.4.2 Size glass to withstand loads acting normal to plane of glass, as calculated in accordance with code and measured to ASTM E283.

1.4.3 Limit glass deflection to 1/200 or flexure limit of glass with full recovery of glazing materials, whichever is less.

1.5 Submittals for Review

1.5.1 Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling, or installation requirements.

1.5.2 Product Data on Glazing Compounds: Provide chemical, functional and environmental characteristics, limitations, special applications requirements. Identify available colours.

1.5.3 Samples: Submit two (2) samples, 300 x 300 mm in size, exemplifying glass, plastic, sealed units, colouration and design.

1.5.4 Submit samples in accordance with Section 01 78 10 - Submittals.

1.6 Submittals for Information

1.6.1 Certificates: Certify that Products meet or exceed specified requirements.

1.7 Quality Assurance

1.7.1 Perform Work in accordance with GANA Glazing Manual, GANA Sealant Manual, and IFMAC for glazing installation methods.

1.7.2 Installer Qualifications: Company specializing in performing the work of this section with minimum five (5) years documented experience.

1.8 Pre-Installation Meeting

1.8.1 Convene one (1) week before starting work of this section.

1.9 Environmental Requirements

1.9.1 Environmental conditions affecting products on site.

1.9.2 Do not install glazing when ambient temperature is less than 10 degrees C.

1.9.3 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.10 Warranty

1.10.1 Provide a ten (10) year warranty to include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.

1.11 Extra Materials

1.11.1 Provide one (1) of each glass size and each glass type.

PART 2 PRODUCTS

2.1 Flat Glass Materials

2.1.1 Safety Glass: CAN/CGSB-12.1, Clear; fully tempered with horizontal tempering, thickness as specified on drawings (12 mm minimum thick)

2.1.2 Low-iron Glass: CAN/CGSB-12.1, Clear; fully tempered with horizontal tempering, thickness as specified on drawings (12 mm minimum thick)

2.4 Plastic Sheet Materials

2.4.1 N/A

2.5 Glazing Compounds

- 2.5.1 Butyl Sealant (Concealed Locations): Single component; Shore A hardness of 10 to 20, Black colour; non-skinning.
- 2.5.2 Polyurethane Sealant (Frame Perimeter): Single component, chemical curing, non-staining, non-bleeding, Shore A Hardness Range 20 to 35; colour as selected.
- 2.5.3 Silicone Sealant (Glazing): Single component; chemical curing; capable of water immersion without loss of properties; non-bleeding, non-staining, cured Shore A hardness of 15 to 25; colour to be clear unless otherwise noted.

2.6 Glazing Accessories

- 2.6.1 Strip Gaskets: Ozone-resistant neoprene compound, reglet type, tensile strength of 14 MPa, Durometer hardness of 75 tested to ASTM D1149, sized to accommodate glass thickness.
- 2.6.2 Setting Blocks: Neoprene or silicone type, 80 to 90 Shore A durometer hardness, length of 25 mm for each square metre of glazing or minimum 100 mm x width of glazing rabbet space minus 1.5 mm x height to suit glazing method and pane weight and area.
- 2.6.3 Spacer Shims: Neoprene or silicone, 50 to 60 Shore A durometer hardness, minimum 75 mm long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- 2.6.4 Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; coiled on release paper; Black colour.
- 2.6.5 Glazing Splines: Resilient polyvinyl chloride or silicone extruded shape to suit glazing channel retaining slot; colour as selected.
- 2.6.6 Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION**3.1 Examination**

- 3.1.1 Verification of existing conditions before starting work.
- 3.1.2 Verify that openings for glazing are correctly sized and within tolerance.
- 3.1.3 Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.2 Preparation

- 3.2.1 Clean contact surfaces with solvent and wipe dry.
- 3.2.2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- 3.2.3 Prime surfaces scheduled to receive sealant.
- 3.2.4 Install sealant in accordance with manufacturer's instructions.

3.3 Installation – Interior, Tape & Sealant

- 3.3.1 Cut glazing tape to length and set against permanent stops, projecting 1.6 mm above sight line.
- 3.3.2 Fill gap between glass and applied stop with sealant to depth equal to bite of frame on glass to uniform and level line
- 3.3.2 Place setting blocks at ¼ points with edge block no more than 150 mm from corners.
- 3.3.3 Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
- 3.3.4 Install neoprene gaskets to prevent any rattling of glass. See finishes schedule for color.
- 3.3.4 Place glazing tape on free perimeter of glazing in same manner described above.
- 3.3.5 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- 3.3.6 Provide edge clearance of 3 mm minimum.
- 3.3.7 Apply cap bead of sealant at void. Apply sealant to uniform and level line, flush with sightline and tooled or wiped with solvent to smooth appearance.
- 3.3.8 Do not cut or abrade tempered, heat treated, or coated glass.
- 3.3.9 Provide adequate edge clearances for plastic glazing sheets in accordance with manufacturer's instructions.
- 3.3.10 Knife trim protruding tape.

3.4 Mirror Installation

- 3.4.3 N/A

3.5 Manufacturer's Field Services

- 3.5.1 Glass and glazing product manufactures to provide field surveillance of the installation of their products.
- 3.5.2 Monitor and report installation procedures, unacceptable conditions.

3.6 Cleaning

- 3.6.3 Clean installed work.
- 3.6.4 Remove glazing materials from finish surfaces.
- 3.6.5 Remove labels after Work is complete.
- 3.6.6 Clean glass and adjacent surfaces.

3.7 Protection of Finished Work

- 3.7.3 Protect installed work.
- 3.7.4 After installation for safety, immediately mark pane with an 'X' by using removable plastic tape or paste. Remove only when vision strip is installed. Any remaining residue from tape on glass must be removed.

END OF SECTION

PART 1 GENERAL**1.1 Work Included**

- 1.1.1 Comply with Division 1, General Requirements and all documents referred to therein.
- 1.1.2 Architectural film applied to glass.

1.2 Submittals

- 1.2.1 Submit under provisions of Section 01 78 10.
- 1.2.2 Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations and installation methods.
- 1.2.3 Shop Drawings: Detailing installation of film, anchoring accessories and sealant.
- 1.2.4 Submit Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, colour and patterns for Designer approval.
- 1.2.5 Submit Manufacturer's warranty information for review by Designer.

1.3 Quality Assurance

- 1.3.1 Manufacturer Qualifications: Glazing film manufacturer specializing in manufacturer of safety glazing films with minimum 5 years successful experience.
- 1.3.2 Installer Qualifications: Documented experience in the application of self adhesive window films with at least 10 applications of similar size and complexity, and approved by the solar film manufacturer.
- 1.3.3 Mock-up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1.3.3.1 Apply film to one window designated by Designer.
 - 1.3.3.2 Do not proceed with remaining work until Designer approves workmanship, colour and sheen.
 - 1.3.3.3 Refinish mock-up area as required to produce acceptable work.

1.4 Delivery and Handling

- 1.4.1 Store products in manufacturer's unopened packaging until ready for installation.

1.5 Site Conditions

- 1.5.1 Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results.
- 1.5.2 Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS**2.1 Materials**

2.1.1 Request for substitutions will be considered for product specified.

2.2 Architectural Film

2.2.1 Commercial film shall be manufactured from polyethylene terephthalate polyester. The finished film shall be self adhesive and include a coating to reduce the effects of scratching and abrasions that occur in normal daily activity and also include absorbers and inhibitors for the purpose of reducing ultra violet rays.

2.3 Smart Film

2.3.1 Commercial film shall offer privacy by switching between transparent (ON) and opaque (OFF) modes. All required system components to be included. The table below is a guideline for Smart film specifications:

	ITEM	MODE	SPECIFICATION
Optical Parameters	Visible Light Transmittance	On	≥91%
		Off	≥55%
	Haze	On	<2.5%
		Off	>90%
	View Angle	On	>175°
	UV Blockage	On	98%
		Off	98%
	Infrared Blockage	On	95%
Off		95%	
Electrical Parameters	Operating Voltage	On	48V (AC 50/60HZ)
	Response Time	Off-On	<20ms
		On-Off	<10ms
Power Consumption	On	<4W/m ²	
Environmental Parameters	Operating Temperature	On	-20°C to +75°C
Working Life		On	80-100000 Hrs

PART 3 EXECUTION**3.1 Examination**

3.1.1 Verify that existing conditions are adequate for proper application and performance of film.

3.1.2 Verify glass is not cracked, chipped, broken or damaged.

3.1.3 Do not begin installation until substrates have been properly prepared.

3.1.4 If substrate preparation is the responsibility of another installer, notify Consultant of unsatisfactory preparation before proceeding.

3.2 **Installation**

- 3.2.1 Prepare surface using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- 3.2.2 Install in accordance with manufacturer's instructions. Installation must be accomplished by a recognized professional installer of film for energy control purposes. Completed work must meet IWFA visual acceptance standard.
- 3.2.3 Install without bubbles, ripples, dirt, cuts, tears or gaps between film and frame.
- 3.2.4 Coordinate installation of Smart Film so wiring is concealed within glazing frame and not visible at film edges.
- 3.2.5 Clean newly installed film and window frames after installation.
- 3.2.6 Remove cleaning solutions, run-off cleaning water and adhesive mounting solution.
- 3.2.7 At the end of the project, invite the ESA field inspector to inspect the installed Smart Film to obtain an approval sticker.

3.3 **Cleaning & Protection**

- 3.3.1 Protect installed products until completion of project.
- 3.3.2 Where installed film could be damaged by subsequent construction provide tape warning strips or barricades to prevent contact.

END OF SECTION

PART 1 GENERAL**1.1 Related Work**

- 1.1.1 Work to comply with Division 1 General Requirements.
- 1.1.2 Gypsum Board: Section 09 21 10.
- 1.1.3 Setting door and window Section 08 12 00 frame:

PART 2 PRODUCTS**2.1 Materials**

- 2.1.1 Non-loadbearing channel stud framing: to ASTM C645-83, stud size as indicated, roll formed from 0.53 mm (and 0.91 mm at jambs) thickness hot dipped galvanized steel sheet, for screw attachment of gypsum board. Knock-out service holes at 460 mm centres.
- 2.1.2 Floor and ceiling tracks: to ASTM C645-83, in widths and gauge to suit stud sizes and location, 32 mm flange height. All floor tracks are to receive a 0.91 mm metal backing, 200 mm high on both sides to create a recessed base as indicated in the drawings. See drawings for further information on gauge variations.
- 2.1.3 Minimum gauge to be 25 unless otherwise specified on plans. Increase stud gauge as required per site conditions, good building practice & installation conditions.
- 2.1.4 Metal channel stiffener: 40 mm x 2 mm size, 1.4 mm thick cold rolled steel, coated with rust inhibitive coating.
- 2.1.5 Acoustical sealant: to CGSB 19-GP-21M and SCAQMD Rule #1168.
- 2.1.6 Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, 12 mm wide, with self sticking adhesive on one face, lengths as required.
- 2.1.7 Provide all accessories as required.
- 2.1.8 To have a recycled content not less than 90%.

PART 3 EXECUTION**3.1 Erection**

- 3.1.1 Align partition tracks at floor and ceiling and secure at 600 mm o.c. maximum.
- 3.1.2 Install dampproof course under stud shoe tracks of partitions on slabs on grade.
- 3.1.3 Place studs vertically at 400 mm o.c. unless otherwise shown, and not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.
- 3.1.4 Erect metal studding to tolerance of 1:1000.
- 3.1.5 Attach studs to bottom and ceiling tracks using screws.
- 3.1.6 Coordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.

- 3.1.7 Coordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.
- 3.1.8 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified. Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.
- 3.1.9 Install heavy gauge single jamb studs at openings. Required reinforcing to extend from slab to slab.
- 3.1.10 Erect track at head of door/window openings and sills of sidelight/window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.
- 3.1.11 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers and Consultants.
- 3.1.12 Provide 40 mm stud or furring channel, unless other side shown, secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions. Provide adequate reinforcing for framing to receive wall mounted counters and vanities. Provide wood blocking reinforcement behind millwork locations to suit. See Drawings.
- 3.1.13 Install steel studs or furring channel between studs for attaching electrical and other boxes.
- 3.1.14 Extend partitions to ceiling height except where noted otherwise on drawings.
- 3.1.15 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs.
- 3.1.16 Install continuous insulating strips to isolate studs from uninsulated surfaces.
- 3.1.17 Install acoustical sealant and insulating strip under studs and tracks around perimeter of sound control partitions.
- 3.1.18 Do not utilize screwed fasteners on exterior window mullions or suspended ceiling grid.
- 3.1.19 Ceiling track to be secured to Base Building T-Bar using clip accessory at 2'0" centres, as per Landlord requirements.

END OF SECTION

PART 1 GENERAL**1.1 Related Work**

- 1.1.1 Work to comply with Division 1 General Requirements.
- 1.1.2 Rough Carpentry: Section 06 10 13
- 1.1.3 Batt Insulation: Section 07 21 30
- 1.1.4 Metal Stud System: Section 09 11 10
- 1.1.5 Furring: Section 09 22 13

1.2 Reference Standards

- 1.2.1 Do work in accordance with CSA A82.31-M1980 except where specified otherwise.

PART 2 PRODUCTS**2.1 Gypsum Board**

- 2.1.1 Plain: to CSA A82.27-M1977.
 - 2.1.1.1 Standard 12.7 mm thick, 1200 mm wide x maximum practical length, ends square cut, edges tapered.
 - 2.1.1.2 Type "X" 12.7 mm thick, 1200 mm wide x maximum practical length, ends square cut, edges tapered.
 - 2.1.1.3 Verify and utilize type and thickness of gypsum board specified on drawings.
- 2.1.2 Backing board and coreboard: to CSA A82.27-M1977 standard or Type "X" as required, 9.5 mm thick, squared edges.
- 2.1.3 Water resistant board: to CSA A82.27-M1977 standard or Type "X", as required, 12.7 mm thick, 600 mm wide x maximum practical length.
- 2.1.4 Reinforced cement board: aggregated portland cement board with vinyl-coated, woven glass-fibre mesh embedded in front and back surfaces, specially formulated to resist water and steam, square cut and smooth finish edges, 900 mm wide c maximum practical length.

2.2 Metal Furring and Suspension Systems

- 2.2.1 Metal furring runners, hangers, tie wires, inserts, anchors: to CSA A82.30-M1980, galvanized.
- 2.2.2 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.
- 2.2.3 Resilient clips, where applicable: 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.

2.3 Fastenings and Adhesives

- 2.3.1 Nails, screws and staples: to CSA A82.31- M1980.
- 2.3.2 Stud adhesive: to CGSB 71-GP-25M.
- 2.3.3 Laminating compound: to CSA A82.31-M1980, asbestos-free.

2.4 Accessories

- 2.4.1 Casing beads, corner beads fill type: 0.5 mm base thickness commercial grade sheet steel with Z275 zinc finish to ASTM A525M-80, perforated flanges; one piece length per location.
- 2.4.2 Cornice cap: 12.7 mm deep x partition width, of 1.6 mm base thickness galvanized sheet steel, prime painted. Include splice plates for joints.
- 2.4.3 Mouldings: as specified on drawings.
- 2.4.4 Acoustic sealant: to CGSB 19-GP-21M.
- 2.4.5 Polyethylene: to CAN/CGSB-51.33-M80, Type 2.
- 2.4.6 Insulating strip: rubberized, moisture resistant, 3 mm thick closed cell neoprene strip, 12 mm wide, with self sticking permanent adhesive on one face, lengths as required.
- 2.4.7 Joint compound: to CSA A82.31-M1980, asbestos free, include perforated tape reinforcement, 50 mm wide. Joint compound and tape shall be of same manufacturer as gypsum board.

2.5 Finish

- 2.5.1 Texture finish: asbestos-free standard white texture coating and primer-sealer, recommended by gypsum board manufacturer.

PART 3 EXECUTION**3.1 Suspended and Furred Ceilings**

- 3.1.1 Erect hangers and runner channels for suspended gypsum board ceilings independent of partitions and in accordance with CSA A82.31-M1980 except where specified otherwise. Hangers shall not be secured to pipes, ducts or any electrical or mechanical items.
- 3.1.2 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- 3.1.3 Install work level to tolerance of 1:1200.
- 3.1.4 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, and grilles.
- 3.1.5 Install 19 x 64 mm furring channels parallel to, and at exact locations of steel stud partition header track.

3.2 Ceiling Bulkheads

- 3.2.1 Furr for gypsum board faced vertical bulkheads within and at termination of ceilings.
- 3.2.2 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated. See drawings for locations.

3.3 Wall Furring

- 3.3.1 Install wall furring for gypsum board wall finishes in accordance with CSA A82.31-M1980, except where specified otherwise.
- 3.3.2 Furr openings and around built-in equipment, cabinets, access panels, and washroom accessories on four sides. Extend furring into reveals. Check clearances with equipment suppliers.
- 3.3.3 Furr duct shafts, beams, columns, pipes and exposed services where indicated.

3.4 Gypsum Board Application

- 3.4.1 Do not apply gypsum board until bucks, anchors, blocking, electrical and mechanical work are approved.
- 3.4.2 Apply single or double layer gypsum board, as indicated, to metal furring or framing using screw fasteners for first layer, and screw fasteners for second layer. Maximum spacing of screws 12 inches o.c. (300mm).
- 3.4.3 Apply single or double layer gypsum board as indicated to concrete and/or concrete block surfaces, where indicated.
- 3.4.4 Apply water resistant gypsum board where wall tiles are to be applied and adjacent to slop sinks, and other locations as indicated. Apply water-resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads. Do not apply joint treatment on areas to receive tile finish.
- 3.4.5 Apply 12mm diameter bead of acoustic sealant continuously around periphery of each face of partitioning to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts, etc., in partitions where perimeter sealed with acoustic sealant.
- 3.4.6 Unless otherwise noted, all gypsum board ceilings shall be constructed of ½ inch thick (12.7mm) gypsum board.
- 3.4.7 Make allowance for air-transfer openings structural profiles in above ceiling partition construction. Review Mechanical Drawings to establish locations. Provide openings in gypsum board baffle (in plenum space) to accommodate all cross-talk silencer ducts. Refer to Mechanical Drawings and Specifications for type and location. Coordinate with partition type and partition location plans. Refer to Reflected Ceiling drawings for above ceiling drywall locations.
- 3.4.8 Provide all openings in gypsum board ceilings to accommodate sprinklers, exit lights, access panels, pot lights, air diffusers and speakers.

3.5 Fire Rated Assemblies

- 3.5.1 Construct ULC fire rated assemblies where indicated. See wall type details.

3.6 **Accessories**

- 3.6.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full-length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150mm o.c.
- 3.6.2 Install casing beads around perimeter of suspended ceilings.
- 3.6.3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Neatly seal joints with sealant.
- 3.6.4 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and door frames, to provide acoustic break.

3.7 **Cornice Caps**

- 3.7.1 Install cornice cap where gypsum board partitions do not extend to ceiling.
- 3.7.2 Fit cornice cap over partition, secure to partition track with two rows of sheet metal screws staggered at 300mm o.c.
- 3.7.3 Splice corners and intersections together and secure to each member with a minimum of three (3) screws.

3.8 **Access Doors**

- 3.8.1 Install drywall access doors for electrical, mechanical and other fixtures as required in drywall ceiling areas. Refer to drawings for typical detail.
- 3.8.2 Rigidly secure frames to furring or framing systems.

3.9 **Taping and Filling**

- 3.9.1 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.
- 3.9.2 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
- 3.9.3 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.
- 3.9.4 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- 3.9.5 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.
- 3.9.6 Provide continuous acoustical seal around all electrical or mechanical outlets and accessories.

3.10 **Textured Finish**

- 3.10.1 Apply one coat of white primer sealer over surface to be textured. When dry apply textured finish in accordance with manufacturer's instructions.

3.11 **Skim Coat**

- 3.11.1 Use skim coating where specified on the drawings.
- 3.11.2 Mix joint compound slightly thinner than for joint taping.
- 3.11.3 Apply thin coat to entire surface using trowel or drywall broadknife to fill surface texture differences, variations or tool marks.
- 3.11.4 Allow skim coat to dry completely.
- 3.11.5 Remove ridges by light sanding and wiping with damp cloth.

3.12 **Reinforced Cement Board**

- 3.12.1 Pre-cut board to required sizes and make necessary cutouts.
- 3.12.2 Fit ends and edges closely but not forced together.
- 3.12.3 Fasten board to wood studs with 38mm galvanized fasteners or blued or galvanized annular ring nails at 200mm o.c.
- 3.12.4 Fasten board to steel studs with rust proof self-drilling, self-threading case hardened screws at 200mm o.c.
- 3.12.5 Filling and reinforcing of joints between board is specified in Section 09 30 11 - Ceramic Tile.

3.13 **Existing Ceiling Access**

- 3.13.1 Cut open existing ceiling areas where required for installation of new or relocation of existing fixtures or fitments. Make good upon completion of installation.

END OF SECTION

PART 1 GENERAL**1.1 Related Work**

- 1.1.1 Work to comply with Division 1 General Requirements.
- 1.1.2 Rough Carpentry: Section 06 10 13.
- 1.1.3 Acoustical Ceilings: Section 09 51 00.
- 1.1.4 Gypsum Boards: Section 09 21 10.

1.2 Reference Standards

- 1.2.1 Furring and lathing work: in accordance with CSA A82.30-M1980 except as specified otherwise.

PART 2 PRODUCTS**2.1 Materials**

- 2.1.1 Metal furring (channels, hangers, tie wire, inserts, anchors): CSA A82.30-M1980.
- 2.1.2 Metal accessories (corner beads, base screeds, cornerite, casing beads): CSA A82.30-M1980.

PART 3 EXECUTION**3.1 Furring and Plastering**

- 3.1.1 Furring indicated on drawings is schematic. Do not regard as exact or complete.
- 3.1.2 Use galvanized supports, members, angles and metal lathing in wet areas.
- 3.1.3 Leave finished work rigid, secure, square, level, plumb, curved to detailed radius and erected to maintain finish plaster line dimensions and contours. Make allowance for thermal movement.
- 3.1.4 Provide clearance under beams and structural slabs to prevent transmission of structural loads to vertical furring.

3.2 Ceiling Furring

- 3.2.1 Install runners level to tolerance of 3mm over 3.5m. Provide runners at interruptions of continuity and change in direction.
- 3.2.2 Frame with furring channels, perimeter of openings to accommodate access panels, light fixtures, diffusers and grilles.
- 3.2.3 Furr for vertical bulkheads within or at termination of ceilings.
- 3.2.4 Furr above suspended ceilings for fire and sound stops and to form plenum areas indicated.
- 3.2.5 Provide expansion joints assemblies as per drywall manufacturer's recommendation.

3.3 **Wall Furring**

- 3.3.1 Install steel furring for walls that are furred out as indicated.
- 3.3.2 Frame openings and around built-in equipment, cabinets, access panels, on four sides, with channels. Extend furring into reveals. Check clearances with equipment suppliers.
- 3.3.3 Construct bulkheads and boxed-in duct shafts, for beams, columns, pipes and around exposed services where indicated. Install 19mm channels at corners and at 300mm o.c.

3.4 **Fire Rated Assemblies**

- 3.4.1 Install furring where indicated, to obtain specified fire ratings to ULC design.
- 3.4.2 Extend furring and lathing on fire rated columns and partitions to underside of floor and roof structure above ceiling.

3.5 **Accessories**

- 3.5.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 220mm o.c.
- 3.5.2 Install corner beads on external angles.

3.6 **Access Doors and Plaster Rings**

- 3.6.1 Install rings and frames for electrical and mechanical fixtures.
- 3.6.2 Rigidly secure rings and frames to furring and lathing systems.

END OF SECTION

PART 1 GENERAL**1.1 Reference Standards**

- 1.1.1 Work to comply with Division 1 General Requirements.
- 1.1.2 Do tile work in accordance with Installation Manual 200-1979, "Ceramic Tile", produced by Terrazzo Tile and Marble Association of Canada (TTMAC), except where specified otherwise.

1.2 Samples

- 1.2.1 Submit samples in accordance with Section 01 78 10 - Submittals.
- 1.2.2 Submit duplicate 12 inch by 12 inch (300mm by 300mm) sample panels of each colour, texture, size, and pattern of tile.
- 1.2.3 Adhere tile samples to ½ inch (12.7mm) thick plywood and grout joints to represent project installation.

1.3 Environmental Conditions

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

PART 2 PRODUCTS**2.1 Wall Tile**

- 2.1.1 Ceramic tile: as specified on drawings.

2.2 Mortar and Adhesive Materials

- 2.2.1 As per manufacturer's recommendations.

2.3 Grout

- 2.3.1 As per manufacturer's recommendations and consultants specified colour(s). Contact consultant to confirm grout colouring if none specified.

2.4 Accessories

- 2.4.1 Reinforcing mesh: 50 x 50 x 1.6 mm galvanized steel wire mesh.
- 2.4.2 Sealant: in accordance with Section 07 92 00 - Sealants, colour selected by Consultant.
- 2.4.3 Wall sealer and protective coating: to tile and grout manufacturers recommendations.

2.5 Mortar and Adhesive Mixes

- 2.5.1 Scratch coat: 1 part portland cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand, 1 part water. Adjust water volume depending on water content of sand.
- 2.5.2 Slurry bond coat: portland cement and water mixed to creamy paste. Latex additive may be included.
- 2.5.3 Mortar bed for walls and ceilings: 1 part portland cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand and 1 part water. Adjust water volume depending on water content of sand. Latex additive may be included.
- 2.5.4 Levelling coat: 1 part portland cement, 4 parts sand, minimum 1/10 part latex additive, 1 part water including latex additive.

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

2.5.6 Measure mortar ingredients by volume.

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

2.5.8 Organic adhesive: pre-mixed. To meet or exceed SCAQMD #1168.

PART 3 EXECUTION

3.1 Workmanship

3.1.1 Apply metal lath in accordance with CSA A82.30-M1980.

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

3.1.3 Fit tile around corners, fitments, fixtures, and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even.

3.1.4 Maximum surface tolerance [1:800].

3.1.5 Make joints between tile uniform and approximately 1.5mm wide, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.

3.1.6 Lay out tiles so perimeter tiles are minimum 1/2 size.

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

3.1.8 Use specified metal tile trim at termination of wall tile panels, except where panel abuts projecting surface or differing plane.

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

3.1.10 Clean installed tile surfaces after installation and grouting cures.

3.2 Wall Sealer and Protective Coating

3.2.1 Apply in accordance with manufacturer's instructions.

END OF SECTION

Part 1 GENERAL**1.1 Related Work**

Drawings and general provisions of the contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

1.2 Summary

A. Section includes quartz surfacing for (includes, but not limited to):

1. Countertops.
2. Windowsills.
3. Vanity tops.
4. Tabletops.
5. Bar tops.
6. Seating.
7. Hot and cold cafeteria surfaces.
8. Interior steps.
9. Interior wainscoat & wall cladding.
10. Shower & bath enclosures.

B. Related Sections include the following;

1. Administrative, procedural and temporary work requirements.
2. Division 5 Section **Metal Fabrication** for blocking.
3. Division 6 Section **Rough Carpentry** for blocking.
4. Division 6 Section **Solid Surface Fabrications**.
5. Division 7 Section **Joint Sealers**.
6. Division 9 Section **Stone Flooring**.
7. Division 9 Section **Solid Surface Wall Cladding**.
8. Division 9 Section **Quartz Surface Wall Cladding**.
9. Division 10 **Quartz Surface Toilet Partitions**.
10. Division 15 **Plumbing Fixtures**.
11. Division 16 **Wiring Devices**.

1.3 References

A. ASTM International:

1. C97 Absorption and Bulk Specific Gravity of Dimension Stone.
2. C99 Modulus of Rupture of Dimension Stone.
3. C170 Compressive Strength of Dimension Stone.
4. C501 Relative Resistance to Wear of Unglazed Ceramic Tile by Taber Abrasion.
5. C482 Bond Strength of Ceramic Tile to Portland Cement.
6. C484 Thermal Shock Resistance of Grazed Ceramic Tile.
7. C531 Linear Shrinkage and Coefficient of Thermal Expansion of Chemical - Resistant Mortars, Grouts, Monolithic Surfacing and Polymer Concrete.
8. C648 Breaking Strength of Ceramic Tile.
9. C1026 Resistance of Ceramic Tile to Freeze Thaw Cycling.
10. C1028 Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull Meter Method.
11. E84 Surface Burning Characteristics of Building Materials.
12. E662 Specific Optical Density of Smoke Generated by Solid Materials.

B. American National Standards Institute (ANSI):

1. ANSI Z124.6 Stain Resistance

1.4 Submittals

- A. Product Data:
 - 1. Quartz Surfacing; Submit manufacturer's product data.
 - 2. Quartz Surfacing; Submit manufacturer's care and maintenance data.
- B. Samples:
 - 1. Submit two 4" x 4" inch quartz samples [showing available colors].
- C. Adhesive:
 - 1. Submit two 1" X 1" samples of adhesive joint for each color quartz surface selected.
- D. Shop Drawings
 - 1. Drawings to include countertop layout, dimensions, required locations of support and blocking members, edge profiles, cutouts and attachments.
- E. Fabricator Qualifications:
 - 1. Work of this section shall be performed by a certified fabricator/installer certified in writing by the manufacturer.

1.5 Quality Assurance

- A. Mockup:
 - 1. Construct mockup (if requested by Interior Designer) 12" wide, full depth with backsplash, skirt. In addition, include plumbing fixtures and trim.
 - 2. Approved mockup shall remain as part of the work.
- B. Delivery, Storage and Handling:
 - 1. Packaging, Shipping, Handling and Unloading; Observe manufacturer's recommendations and handle in a manner to prevent breakage. Brace parts if necessary. Transport in the near vertical position with finished face toward finished face. Do not allow finished surfaces to rub during shipping and handling.
- C. Storage and Protection:
 - 1. Store in racks in near vertical position. Prevent warpage and breakage. Store Inside away from direct exposure to sunlight. Store between 25 and 130°F.

1.6 Warranty

- A. Closeout Submittals:
 - 1. Provide manufacturer's completed warranty form.

Part 2 - Products

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Refer to finish schedule.
- B. Substitution: Not allowed.

2.2 MATERIALS

- A. Material:
 - 1. Homogeneous mixture containing 93% pure quartz with additions of high performance polyester resin, pigments and special effects. Manufacturer is licensed to utilize Bretonstone™ technology and equipment used to compact and polish mixture.
- B. Thickness: as per finish schedule.
- C. Identification:
 - 1. Material shall be labeled with manufacturer's identifying mark.
- D. Color: as per finish schedule.
- E. Finish: as per finish schedule.
- F. Exposed Edges and Corners:
 - 1. Refer to Details
- G. Performance:
 - 1. Moisture Absorption: typical results 0.02%; ASTM C97
 - 2. Modulus of Rupture: typical results 6,800 psi; ASTM C99
 - 3. Compressive Strength: typical results 24,750 psi; ASTM C170
 - 4. Abrasion Resistance: typical results 223; ASTM C501
 - 5. Bond Strength: typical results 205 psi; ASTM C482
 - 6. Thermal Shock: passes 5 cycles: ASTM 484
 - 7. Coefficient of Thermal Expansion: typical results 1.2x10-5 inch/°F; ASTM C531

8. Breaking Strength of Tile: typical results 3,661 lbf; ASTM C648
9. Resistance to Freeze Thaw Cycling: unaffected 15 cycles; ASTM C1026
10. Coefficient of Friction Pull Method: .75 avg. dry / .55 avg. wet; ASTM C1028
11. Surface Burning Characteristics: typical results 17; ASTM E84
12. Smoke Density: flaming 196, non-flaming 69; ASTM E662
13. Stain Resistance: Unaffected; ANSI Z124.6

2.3 ACCESSORIES

A. Mounting Adhesive:

1. Provide structural grade '50 year' silicone or epoxy adhesive.
2. Acceptable silicone manufactures:
 - a. Submit
3. Acceptable epoxy manufactures:
 - a. Submit

B. Quartz Surface Adhesive:

1. Provide epoxy or polyester adhesive of a type recommended by manufacturer for application and conditions of use.
2. Acceptable manufacturers:
 - a. Cambria Two Part Acrylic Adhesive.
 - b. Akemi North America.
 - c. Bonstone Material Corporation.
 - d. Tenax USA.
3. Adhesive which will be visible in finished work shall be tinted to match quartz Surface.

C. Joint Sealant:

1. Clear sealant of type recommended by manufacturer for application and use.
2. Provide anti-bacterial type in toilet, bath, food preparation.
3. Acceptable manufacturers:
 - a. Dow Corning.
 - b. GE Sealants.

D. Solvent: Denatured alcohol for cleaning quartz surfacing to assure adhesion of adhesives and sealants.

E. Cleaning Agents: Mild soap and water.

2.4 FABRICATION

A. Fabricator:

1. Fabricator shall be by a certified Fabricator, certified in writing by Manufacturer.

B. Layout:

1. Layout surface to minimize joints and avoid L-shaped pieces of quartz surfacing. Layout and fabricate with 'hairline' joints.

C. Inspection of Materials:

1. Inspect materials for defects prior to fabrication.

D. Tools: Cut and polish with water cooled powered tools.

E. Cutouts:

1. Cutouts shall have a minimum of 3/8 inch (10mm) radius.
2. Where edges of cutouts will be exposed in finished work; polish edges.

F. Laminations:

1. Laminate layers of quartz surfacing as required to create built up edges following procedures recommended by the manufacturer.

PART 3- EXECUTION

3.1 INSTALLER

- A. Installation shall be by a certified Installer, certified in writing by Manufacturer.

3.2 PRE-INSTALLATION EXAMINATION

A. Site Verification:

1. Verify dimensions by field measurements prior to installation.
2. Verify that substrates supporting quartz surfaces are plumb, level and flat to within 1/8 inch in 10 feet and that all necessary supports and blocking are in place.
3. Base Cabinets shall be secured to adjoining units and back wall.

B. Inspection of Quartz Surfaces:

1. Inspect materials for defects prior to installation.

3.3 PREPARATION**A. Prepare Surface:**

1. Clean surfaces prior to installation.

B. Protection of Quartz Surfaces:

1. Protect finished surfaces from scratches. Apply masking where necessary. Take necessary precautions to prevent dirt, grit, dust and debris from other trades from contacting the surface.

3.4 INSTALLATION**A. Install materials in accordance with manufacturer's instructions and approved shop drawings.****B. Preliminary Installation:**

1. Position materials to verify the correct size.
2. If size adjustments, or additional fabrication is necessary, use water cooled tools. Protect jobsite and surface from dust and water. Perform work away from installation site if possible.
3. Allow gaps for expansion of not less than 1/8 inch (1.5mm) per ten feet when installed between walls or other fixed structure.

C. Permanent Installation:

1. After verification of fit and finish, clean substrate; remove loose and foreign matter which may interfere with adhesion. Clean quartz surface backside & joints with denatured alcohol.
2. Horizontal surface: Apply continuous bead of mounting adhesive around perimeter of structural substrate and supports.
3. Vertical surface: Apply continuous bead of mounting adhesive around perimeter. In addition, apply ¼ inch mounting adhesive bead every 8 inches on vertical center.
4. Install quartz surfacing plumb, level, square and flat to within 1/8 inch in ten feet, non-cumulative.
5. Align adjacent pieces in same plane.

D. Joints:

1. Joints Between Adjacent Pieces of Quartz Surfacing:
 - a. Joints shall be flush, tight fitting, level and neat.
 - b. Securely join adjacent pieces with Cambria Two Part Acrylic Adhesive.
 - c. Fill joints level to polished surface.
 - d. Secure adjacent quartz surfaces with vacuum clamps until adhesive hardens.
2. Joints Between Quartz Surface and wall tile:
 - a. Seal joints with '50' year silicone sealant.

3.5 REPAIR

- A. Repair or replace damaged material in a satisfactory manner.

3.6 CLEANING

- A. Remove masking, excessive adhesive and sealants. Clean exposed surfaces with denatured alcohol.

3.7 PROTECTION

- A. Protect installed fabrications with non-staining sheet coverings.

END OF SECTION

1. GENERAL**1.1 WORK INCLUDES**

- 1.1.1 Comply with Division 1, General Requirements, and all documents referred to therein.
- 1.1.2 Provide all labour, materials, products, equipment and services to complete the acoustical ceiling work necessary and/or indicated on the drawings and specified herein, inclusive of:
 - 1.1.2.1 Acoustic ceiling panels.
 - 1.1.2.2 Exposed grid suspension system.
 - 1.1.2.3 Wire hangers, fasteners, main runners, cross tees, and wall angle moldings.

1.2 RELATED WORK (AS APPLICABLE)

- 1.2.1 The following list of divisions is non-exclusive. The General Contractor/Construction Manager shall be responsible for determining all those items in the following General Specifications that shall apply to the specific project.
- 1.2.2 Submittals Section 01 78 10
- 1.2.3 Rough Carpentry Section 06 10 00
- 1.2.4 Flush Wood Doors Section 08 14 16
- 1.2.5 Gypsum Board Systems Section 09 21 10

1.3 REFERENCES

- 1.3.1 ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
- 1.3.2 ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
- 1.3.3 ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- 1.3.4 ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
- 1.3.5 ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
- 1.3.6 ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum.
- 1.3.7 ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems.
- 1.3.8 ASTM E 1264 Classification for Acoustical Ceiling Products.
- 1.3.9 ASTM E 1477 Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
- 1.3.10 ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- 1.3.11 ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Material.
- 1.3.12 ASHRAE Standard 62.1-2004, Ventilation for Acceptable Indoor Air Quality

1.4 QUALITY ASSURANCE

- 1.4.1 Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.
- 1.4.2 Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
- 1.4.2.1 Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 for Class A products.
- Flame Spread: 25 or less
 - Smoke Developed: 50 or less
- 1.4.3 Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.
- 1.4.4 Delivery, Storage and Handling:
- 1.4.4.1 Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
- 1.4.4.2 Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.
- 1.4.4.3 Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.
- 1.4.5 Space Enclosure:
- 1.4.5.1 All ceiling products and suspension systems must be installed and maintained in accordance with manufacturer's written installation instructions for that product in effect at the time of installation and best industry practice. Prior to installation, the ceiling product must be kept clean and dry, in an environment that is between 32°F (0° C) and 120°F (49° C) and not subject to Abnormal Conditions. Abnormal conditions include exposure to chemical fumes, vibrations, moisture from conditions such as building leaks or condensation, excessive humidity, or excessive dirt or dust buildup.
- 1.4.6 Warranty:
- 1.4.6.1 Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to:
- Acoustic Panels: Sagging and warping as a result of defects in materials or factory workmanship.
 - Grid System: Rusting and manufacturer's defects.
- 1.4.6.2 The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.
- 1.4.7 Maintenance:
- 1.4.7.1 Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.
- Acoustical Ceiling Units: Furnish quality of full-size units equal to 10.0 percent of amount installed.

1.5 SUBMITTALS

- 1.5.1 Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.
- 1.5.2 Samples: Minimum 6" x 6" samples of specified acoustical panel; 8" long samples of exposed wall molding and suspension system, including main runner and 4' cross tees.

- 1.5.3 Shop Drawings: Layout and details of acoustical ceilings. Show locations of items which are to be coordinated with, or supported by the ceilings.
- 1.5.4 Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.
- 1.5.5 If the material supplied by the acoustical subcontractor does not have an Underwriters Laboratory classification of acoustical performance on every carton, subcontractor shall be required to send material from every production run appearing on the job to an independent or NVLAP approved laboratory for testing, at the architect's or owner's discretion. All products not conforming to manufacturers current published values must be removed, disposed of and replaced with complying product at the expense of the Contractor performing the work.

2. **PRODUCTS**

2.1 **MANUFACTURERS**

- 2.1.1 Ceiling Panels: Armstrong World Industries, Inc. or approved equal.
- 2.1.2 Surface Texture: Fine.
- 2.1.3 Composition: Mineral Fiber.
- 2.1.4 Color: White.
- 2.1.5 Sizes: 24" x 24" and 20" x 60" as indicated on Reflected Ceiling Plan.
- 2.1.6 Edge Profile: Square Lay-In for interface with Prelude XL 15/16' Exposed Tee or approved equal.
- 2.1.7 Noise Reduction Coefficient (NRC): ASTM C 423; Classified with UL label on product carton, 0.80.
- 2.1.8 Ceiling Attenuation Class (CAC): ASTM C 1414; Classified with UL label on product carton, TBC
- 2.1.9 Articulation Class (AC): ASTM E 1111; Classified with UL label on product carton N/A.
- 2.1.10 Emissions Testing: Section 01350 Protocol, < 13.5 ppb of formaldehyde when used under typical conditions required by ASHRAE Standard 62.1-2004, "Ventilation for Acceptable Indoor Air Quality".
- 2.1.11 Flame Spread: ASTM E 1264; Class A(UL).
- 2.1.12 Light Reflectance (LR): ASTM E 1477; White Panel: Light Reflectance: 0.85.
- 2.1.13 Recycled Content: Total 58% Pre-consumer 57% and 1% Post-consumer October 8, 2008.
- 2.1.14 Acceptable Product: Armstrong World Industries, Inc. or approved equal.
- 2.1.15 Suspension Systems: Armstrong World Industries, Inc. or approved equal.
- 2.1.16 Components: All main beams and cross tees shall be commercial quality hot-dipped galvanized (galvanized steel, aluminum, or stainless steel) as per ASTM A 653. Main beams and cross tees are double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping pre-finished galvanized steel (aluminum or stainless steel) in baked polyester paint. Main beams and cross tees shall have rotary stitching (exception: extruded aluminum or stainless steel).
- Structural Classification: ASTM C 635 Intermediate Duty.
 - Colour: White and match the actual color of the selected ceiling tile, unless noted otherwise.
 - Acceptable Product: Prelude XL 15/16" Exposed Tee as manufactured by Armstrong World Industries, Inc. or approved equal

- 2.1.17 Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.
- 2.1.18 Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper, pre-stretched, with a yield stress load of at least three design load, but not less than 12 gauge.
- 2.1.19 Edge Moldings and Trim: Acceptable perimeter trim for acoustical clouds Armstrong C channel molding 7830 as manufactured by Armstrong World Industries or approved equal. Metal or extruded aluminum of types and profiles indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations, including light fixtures, that fit type of edge detail and suspension system indicated. Provide moldings with exposed flange of the same width as exposed runner.

3. EXECUTION

3.1 INSPECTION

- 3.1.1 Ensure work above ceilings is complete, inspected and approved by the authority having jurisdiction before commencing installation.
- 3.1.2 Examine substrate surfaces/area and report defects including out of plumb and uneven walls before work is commenced. Installation of ceiling shall be considered an acceptance of surfaces/area to be covered.
- 3.1.3 Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturers printed recommendations.

3.2 PREPARATION

- 3.2.1 Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.
- 3.2.2 Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.
- 3.2.3 Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.3 INSTALLATION WORK

- 3.3.1 Coordinate the work with all trades affected by the work of this Section. Provide a layout of hangers and framing suitable to accommodate fittings and units of equipment. Failure to follow this procedure will require that the hangers and channels be revised to suit as necessary without additional cost to the Owner.
- 3.3.2 Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest adjacent hangers and all related carrying channels and furring as required to span the greater distance.
- 3.3.3 Lay out work in accordance with reflected ceiling plans. Provide a tolerance of 1/360 of span and 5/64" (2mm) maximum between adjacent edges of metal pans Allowable tolerance of finished acoustical ceiling system: 1/8" in 12'-0" (4mm in 3600mm) and 1/64" (0.04mm) between adjacent metal members. Tolerances shall not be cumulative.
- 3.3.4 Install suspension system and panels in accordance with the manufacturer's instructions, and in compliance with ASTM C 636 and with the authorities having jurisdiction.
- 3.3.5 Supply hangers or inserts for installation to the respective section in ample time and with clear instructions for their correct placement. Provide additional hangers and inserts as required.
- 3.3.6 Suspend main beam from overhead construction with hanger wires spaced 4'-0" on center along the length of the main runner. Install hanger wires plumb and straight.
- 3.3.7 Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.

- 3.3.8 For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.
- 3.3.9 Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings
- 3.3.10 Design and space hangers and carrying members to support the entire ceiling system, excluding lighting fixtures, diffusers and grilles. Recessed objects shall replace or be centred on acoustical panels except where indicated otherwise. Consult with mechanical and electrical trades to coordinate the work.
- 3.3.11 Secure hangers to the structure. Hang suspended ceilings independently of walls, columns, ducts, pipes and conduit. Where carrying members are spliced avoid visible displacement of the longitudinal axis of face plane of adjacent members.
- 3.3.12 Centre acoustical ceiling installation of room axis leaving equal border pieces unless noted otherwise on plans. Provide a row of hangers adjacent to and parallel with the walls for the support of the ends of the main tee runners at not more than 6 (150mm). Lay directionally patterned tile one way with pattern parallel to longest room axis unless otherwise directed.
- 3.3.13 Install components to form a level ceiling with all parts flush and true, to the pattern shown. Install panels in level, uniform plane free from twist, warp, dents and flush, without gaps and exposed face of carrying members. Fit border units neatly against abutting surfaces.
- 3.3.14 Supply and install all tiles including cut tile and tile at sprinkler heads.

3.4 ADJUSTMENTS

- 3.4.1 Adjust any sags or twists which develop in the suspension system and replace any part of the complete system which is damaged or faulty.
- 3.4.2 Replace damaged and broken panels.
- 3.4.3 Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

PART 1 GENERAL**1.1 Work Included**

- 1.1.1 Work to comply with Division 1 General Requirements.
- 1.1.2 Provide all labour, equipment and services to supply and install stone flooring, and base work required and/or indicated on the drawings and specified herein.

1.2 Submittals

- 1.2.1 Submit three samples of material and finish for approval. Samples shall be 300mm x 300mm to represent the variety of stone specified. Show the range of stone variation which the Contractor proposes to furnish.
- 1.2.2 Submit three copies of a maintenance manual issued by the Terrazzo Tile and Marble Association of Canada at the completion of the work. Include specific warning of any maintenance practice or materials which may damage or disfigure the stone work.

1.3 Handling, Delivery and Storage

- 1.3.1 Handle and store materials during delivery and at the site in such a manner that no damage shall be done to the materials or the work of other Sections.
- 1.3.2 Broken, cracked, chipped, stained or damaged stone shall be rejected whether built-in or not.
- 1.3.3 Store packaged materials, undamaged in their original wrappings or containers with manufacturer's labels and seals intact.

1.4 Protection

- 1.4.1 Wherever necessary protect stone work by covering with substantial, nonstaining dry felt or building paper. Maintain protection until removed to permit final cleaning of the stone work.

PART 2 PRODUCTS**2.1 Materials**

- 2.1.1 Close grained, containing only small fissures of uniform tint throughout, sound, free of cracks, seams, clay pockets, holes or other flaws or defects, even in texture, uniform in colour and marking, all from one quarry and one production lot.
- 2.1.2 Stone Flooring and base: Type and thickness as specified on Finish Drawings and Schedule, to match Consultant's control sample. Contractor/Construction Manager to obtain all required approvals prior to proceeding with work.
- 2.1.3 Colour variations in adjacent units shall be closely controlled especially in adjacent units in the same place. Colour changes for areas as designated may occur within the limits approved only. Consultant to pre-select tiles for consistent coloration.
- 2.1.4 Stainless steel angle divider strip: refer to drawings and finishes schedule.
- 2.1.5 Setting bed for flooring and base members: Dry set mortar bond coat complying with ANSI A118.1 "Floor Mix" and "Wall Mix", as approved and recommended by manufacturer.
- 2.1.6 Grout: Water resistant type, verify with manufacturer for recommended grout mixture, colour and additives. Colour to match Consultant's control sample.
- 2.1.7 Filler: Epoxy filler of colour and material to match samples approved by Consultant.
- 2.1.8 Cement for levelling bed: Nonstaining grey Portland cement complying with CSA A5.

- 2.1.9 Sand shall consist of fine granular material composed of hard, strong, durable mineral particles which shall be free from injurious amounts of saline, alkaline, organic or other deleterious substances, and complying with CSA A82.56.
- 2.1.10 Water: Clean, free of deleterious substances.
- 2.1.11 Colour additive for pointing: Commercial, pure metallic oxide pigment finely ground.
- 2.1.12 Reinforcing mesh: 50 x 50 x 1.6 mm galvanized steel wire mesh.
- 2.1.13 Thresholds: Stone, 19 mm thick, bevelled two sides, honed finish to exposed surfaces, size to suit door opening and frame width. Obtain Consultant's approval of threshold prior to proceeding.
- 2.1.14 Sealant: In accordance with Section 07 92 00 - Sealants, colour selected by consultant.
- 2.1.15 Floor sealer and protective coating: to tile and grout manufacturer's recommendations.

2.2 Finishes

- 2.2.1 Stone: Refer to Finish Drawings and Schedule, to match Consultant's control sample.

PART 3 **EXECUTION**

3.1 Fabrication

- 3.1.1 The work of this Section shall be executed by skilled craftsmen in accordance with Detail S-109 of TTMAC, by a company specializing in veneer stone work.
- 3.1.2 Cut stone accurately to conform with the shape and dimensions shown. Exposed plane surfaces shall be true. Joints shall be dressed straight and unless shown otherwise, at right angles to the face.
- 3.1.3 Joints shall have a uniform thickness.
- 3.1.4 Slightly case or round exposed arises to prevent chipping.
- 3.1.5 Do all cutting and drilling required for other sections of the work.
- 3.1.6 No hand torches or any heat method shall be used in field on stone.

3.2 Installation

- 3.2.1 Schedule stone work for late installation to avoid damage and dirt inflicted by other trades.
- 3.2.2 Clean stones thoroughly on all exposed surfaces by steam cleaning or by washing followed by a thorough drenching with clear water before being set in the work.
- 3.2.3 Sponge or drench with clean water just prior to setting all stones not thoroughly wet.
- 3.2.4 Patching or other forms of concealment to cover defects in material or workmanship shall not be permitted.
- 3.2.5 Lay out work to pattern detailed and generally matched for colour and shade.
- 3.2.6 Set stone work level, plumb, square and true with uniform joints. Chipped, broken or blemished units shall be rejected.
- 3.2.7 Avoid splashing mortar on exposed faces of veneer stone. Remove droppings immediately by means of sponge and clear water.

3.3 Installation - Flooring

- 3.3.1 Ensure substrate surface variations do not exceed $\pm 1/8"$ (3 mm) in 8' - 0" (2400 mm).

- 3.3.2 Distribute units of ranging colour or texture evenly over the entire paved surfaces to avoid patches and streaks, to produce a homogeneous blending of all units.
- 3.3.3 Joints in flooring 1/8" (3 mm), maximum.
- 3.3.4 Flooring shall be true in plane, level to a tolerance of 1/8" (3 mm) in 10' - 0" (3m) measured in any direction.
- 3.3.5 Place on a Dry Set Mortar bond coat. Grout joints solid with mortar and tool to a slightly concave surface.
- 3.3.6 Provide stainless steel angle trim at perimeter of stone flooring where it abuts carpeting.

3.4 Repairing

- 3.4.1 Upon completion of the work, examine the work, cut out and replace any stone found to be cracked, spalled or otherwise injured. Remove defective work of any nature and replace with new material; carefully fill all joints; repolish where reburied. Repairing or replacement of defective materials workmanship shall be made at no additional cost to the Owner.

3.5 Cleaning

- 3.5.1 After installation, clean as follows or as per manufacturer/supplier's recommendations:
- 3.5.1.1 Remove all rubbish and surplus materials.
 - 3.5.1.2 After joints have cured, clean entire surface with water and allow to dry.
 - 3.5.1.3 A 5% solution of inhibited acid may be used to remove remaining scum.
 - 3.5.1.4 Wash with 10% solution of washing soda in water to neutralize acid.
 - 3.5.1.5 When clean and dry, apply one coat of TTMAC no. 3001 finish, or as recommended by manufacturer.

END OF SECTION

PART 1 GENERAL**1.1 Related Work**

1.1.1 Work to comply with Division 1 General Requirements.

1.1.2 Floor access covers: Division 15 & 16

1.2 Samples

1.2.1 Submit duplicate tile samples in size specified, 12 inches (300mm) long base, feature strips, and edge strips for each colour specified, in accordance with Section 01 78 10.

1.3 Maintenance Data

1.3.1 Provide maintenance data for resilient flooring for incorporation into Operation and Maintenance Manual specified in Section 01 78 10.

1.4 Maintenance Materials

1.4.1 Provide minimum 2% of each colour, pattern and type flooring material required for this project for maintenance use. Identify each box. Store where directed.

1.4.2 Maintenance materials to be same production run as installed materials.

1.5 Environmental Requirements

1.5.1 Maintain air temperature and structural base temperature at flooring installation area above 20°C for 48 hours before, during and for 48 hours after installation.

PART 2 PRODUCTS**2.1 Materials**

2.1.1 Vinyl composite tile: to CSA A126.1-1977, Specification as indicated in Finish Schedule.

2.1.2 Specialty floor covering, in areas as shown on the drawings.

2.1.3 Resilient base: top set covered coved or toeless rubber vinyl, minimum 1200mm length and specified height x 2mm thick, including premoulded end stops, and external and internal corners, of colour as indicated in Finish Schedule and/or selected by Consultant. See drawings for further information.

2.1.4 Primers and adhesives: waterproof, recommended by flooring manufacturer for specific material on applicable substrate, above, at or below grade. Meet or exceed SCAQMD Rule #1168, October 2003.

2.1.5 Sub-floor filler and leveler: as recommended by flooring manufacturer for use with their product.

2.1.6 Edge strips: extruded, vinyl or aluminum with lip to extend under adjacent floor finish, shoulder flush with top of adjacent floor finish. Colour to match base as specified on the drawings. Provide in all locations where resilient tile abutts different floor finish.

2.1.7 Sealer: type recommended by flooring manufacturer.

2.1.8 Wax: type recommended by flooring manufacturer.

PART 3 EXECUTION

3.1 Inspection

3.1.1 Ensure concrete floors are dry, by using test methods recommended by tile manufacturer.

3.2 Sub-floor Treatment

3.2.1 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.

3.2.2 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.

3.2.3 Prime and seal concrete to flooring manufacturer's printed instructions.

3.3 Tile Application

3.3.1 Apply adhesive uniformly using recommended trowel in accordance with flooring manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.

3.3.2 Lay flooring with joints as shown on drawings and produce symmetrical tile pattern. Border tiles minimum half tile width.

3.3.3 Install in patterns as shown on drawings. Ensure all joints are properly aligned.

3.3.4 As installation progresses, and after installation, roll flooring with roller as recommended by manufacturer to ensure full adhesion.

3.3.5 Cut tile and fit neatly around fixed objects.

3.3.6 Install flooring in pan type floor access covers, where applicable. Maintain floor pattern.

3.3.7 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.

3.3.8 Terminate flooring at centerline of door in openings where adjacent floor finish or colour is dissimilar.

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

3.3.10 Install tile in accordance with manufacturer's printed instruction to maintain guarantees, in addition, adhere to execution procedures as outlined herein.

3.4 **Base Application**

- 3.4.1 Lay out base to keep number of joints at minimum.
- 3.4.2 Set base in adhesive tightly by using 3 kg hand roller, against wall and floor surfaces.
- 3.4.3 Install straight and level to variation of 1:1000.
- 3.4.4 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
- 3.4.5 Use premoulded corner units for right angle external and internal corners. Use formed straight base material for external and internal corners of other angles.
- 3.4.6 Install toeless type base before installation of carpet on floors, as applicable.

3.5 **Cleaning and Waxing**

- 3.5.1 Remove excess adhesive from floor, base and wall surfaces without damage.
- 3.5.2 Clean, seal and wax floor and base surface to flooring manufacturer's instructions. In carpeted areas clean, seal and wax base surface before carpet installation.

3.6 **Protection of Finished Work**

- 3.6.1 Protect new floors from time of final set of adhesive and after initial waxing until final waxing and inspection.
- 3.6.2 Prohibit traffic on floor for 48 hours after installation.

END OF SECTION

PART 1 GENERAL**1.1 Description**

1.1.1 This section specifies the installation of vinyl or rubber base and resilient stair treads with sheet rubber flooring on landings.

1.2 Related Work

1.2.1 Colour and texture: Refer to Finishes Schedule.

1.2.2 Integral base with sheet flooring: Section 09 67 31, Resilient Sheet Flooring.

1.3 Submittals

1.3.1 Submit in accordance with Section 01 78 10 - Submittals.

1.3.2 Manufacturer's Literature and Data:

1.3.2.1 Description of each product.

1.3.2.2 Base and stair material manufacturer's recommendations for adhesives, must meet or exceed SCAQMD #1168.

1.3.2.3 Application and installation instructions.

1.3.3 Samples:

1.3.3.1 Base: 150mm (6 inches) long, each type and color.

1.3.3.2 Resilient Stair Treads: 150mm (6 inches) long.

1.3.3.3 Sheet Rubber Flooring: 300mm (12 inches) square.

1.3.3.4 Adhesive: Literature indicating each type.

1.4 Delivery

1.4.1 Deliver materials to the site in original sealed packages or containers, clearly marked with the manufacturer's name or brand, type and color, production run number and date of manufacture.

1.4.2 Materials from containers which have been distorted, damaged or opened prior to installation will be rejected.

1.5 Storage

1.5.1 Store materials in weather-tight and dry storage facility.

1.5.2 Protect material from damage by handling and construction operations before, during, and after installation.

1.6 Applicable Publications

1.6.1 The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

- 1.6.2 American Society for Testing and Materials (ASTM): F1344-04 Rubber Floor Tile
F1859-04 Rubber Sheet Floor Covering without Backing
F1860-04 Rubber Sheet Floor Covering with Backing
F1861-02 Resilient Wall Base

- 1.6.3 Federal Specifications (Fed. Spec.):
RR-T-650E Treads, Metallic and Non-Metallic, Nonskid

PART 2 PRODUCTS

2.1 General

- 2.1.1 Use only products by the same manufacturer and from the same production run.

2.2 Resilient Base

- 2.2.1 See Finishes Schedule for specification.

2.3 Resilient Treads

- 2.3.1 Fed. Spec. RR-T-650, Composition A, Type 2, 5mm (3/16 inch) thick on wear surface tapering to 3mm (1/8 inch) thick at riser end.

- 2.3.2 Nosing shape to conform to sub-tread nosing shape.

2.4 Sheet Rubber Flooring

- 2.4.1 ASTM F1344, F1859 or F1860, 900mm (36 inches) wide, 3mm (1/8 inch) thick, smooth face, material by the same manufacturer as the rubber treads, color and pattern to match treads.

- 2.4.2 Use for stair landings.

- 2.4.3 Use rubber flooring made with a minimum of 90% consumer rubber where possible.

2.5 Primer (For Concrete Floors)

- 2.5.1 As recommended by the adhesive and tile manufacturer. To meet or exceed GS-11.

2.6 Leveling Compound (For Concrete Floors)

- 2.6.1 Provide products with latex or polyvinyl acetate resins in the mix.

2.7 Adhesives

- 2.7.1 Use products recommended by the material manufacturer for the conditions of use.

- 2.7.2 Must meet or exceed SCAQMD Rule #1168.

PART 3 EXECUTION**3.1 Project Conditions**

- 3.1.1 Maintain temperature of materials above 21° C (70° F), for 48 hours before installation.
- 3.1.2 Maintain temperature of rooms where work occurs, between 21° C and 27° C (70° F and 80° F) for at least 48 hours before, during, and 48 hours after installation.
- 3.1.3 Do not install materials until building is permanently enclosed and wet construction is complete, dry, and cured.
- 3.1.4 Ensure height of base will fill the space intended to be covered by the base before beginning.

3.2 Installation Requirements

- 3.2.1 The respective manufacturer's instructions for application and installation will be considered for use when approved by the General Contractor/ Construction Manager.
- 3.2.2 Submit proposed installation deviation from this specification to the General Contractor/ Construction Manager indicating the differences in the method of installation.
- 3.2.3 The General Contractor/ Construction Manager reserves the right to have test portions of material installation removed to check for non-uniform adhesion and spotty adhesive coverage.

3.3 Preparation

- 3.3.1 Examine surfaces on which material is to be installed.
- 3.3.2 Fill cracks, pits, and dents with leveling compound.
- 3.3.3 Level floors to within a minimum of 6mm (1/4") over 3 metres (10').
- 3.3.4 Do not use adhesive for leveling or filling.
- 3.3.5 Grind, sand, or cut away protrusions; grind high spots.
- 3.3.6 Clean substrate area of oil, grease, dust, paint, and deleterious substances.
- 3.3.7 Substrate area dry and cured. Perform manufacturer's recommended bond and moisture test.
- 3.3.8 Preparation of existing installation:
 - 3.3.8.1 Remove existing base and stair treads including adhesive.
 - 3.3.8.2 Do not use solvents to remove adhesives.
 - 3.3.8.3 Prepare substrate as specified.

3.4 **Base Installation**

3.4.1 Location:

3.4.1.1 Unless otherwise specified or shown, where base is scheduled, install base over toe space of base of casework, lockers, laboratory, island cabinets and where other equipment occurs.

3.4.1.2 Extend base scheduled for room into adjacent closet, alcoves, and around columns.

3.4.2 Application:

3.4.2.1 Apply adhesive uniformly with no bare spots.

3.4.2.2 Set base with joints aligned and butted to touch for entire height.

3.4.2.3 Before starting installation, lay out base material to provide the minimum number of joints with no strip less than 600mm (24 inches) length.

3.4.2.3.1 Short pieces to save material will not be permitted.

3.4.2.3.2 Locate joints as remote from corners as the material lengths or the wall configuration will permit.

3.4.3 Form corners and end stops as follows:

3.4.3.1 Score back of outside corner.

3.4.3.2 Score face of inside corner and notch cove.

3.4.4 Roll base for complete adhesion.

3.5 **Stair Tread Installation**

3.5.1 N/A

3.6 **Sheet Rubber Installation**

3.6.1 Prepare surfaces to receive sheet rubber in accordance with applicable portions of section "preparation".

3.6.2 Layout of Sheet Rubber:

3.6.2.1 Use minimum number of joints compatible with material direction and symmetrical joint location.

3.6.2.2 Where sheet rubber intersects vertical stair members, other sheets, stair treads, and other resilient materials at the floor landings, material shall touch for the entire length within 5 mils (0.005 inch).

3.6.2.3 Install sheet rubber on floors and intermediate landings where resilient stair treads are installed; center joint with other flooring material under doors.

3.6.3 Application:

3.6.3.1 Apply adhesive uniformly with no bare spots.

3.6.3.2 Roll sheet rubber to assure adhesion.

3.7 Cleaning and Protection

- 3.7.1 Clean all exposed surfaces of base and adjoining areas of adhesive spatter before it sets.
- 3.7.2 Keep traffic off resilient material for at least 72 hours after installation.
- 3.7.3
- 3.7.4 Clean and polish materials in the following order:
- 3.7.4.1 After two weeks, scrub resilient base, sheet rubber and treads materials with a minimum amount of water and a mild detergent. Leave surfaces clean and free of detergent residue. Polish resilient base to a gloss finish.
- 3.7.4.2 Do not polish tread and sheet rubber materials.
- 3.7.5 When construction traffic is anticipated, cover tread materials with reinforced kraft paper and plywood or hardboard properly secured and maintained until removal is directed by the General Contractor/ Construction Manager.
- 3.7.6 Where protective materials are removed and immediately prior to acceptance, replace damaged materials and re-clean resilient materials. Damaged materials are defined as having cuts, gouges, scrapes or tears and not fully adhered.

END OF SECTION

PART 1 GENERAL**1.1 Summary**

1.1.1 Furnish and install carpet tile, base, adhesives and accessories as shown on Construction Drawings or as otherwise requested.

1.2 References

- 1.2.1 American Association of Textile Chemists and Colorists (AATCC)
AATCC 16 Test Method 16, Test Option 16E: Watercooled Xenon Arc Lamp, Continuous Light AATCC 20
Fiber Analysis – Qualitative
AATCC 134 Electrostatic Propensity of Carpets
AATCC 165 Colorfastness to Crocking - AATCC Crockmeter Method
- 1.2.2 American National Standards Institute (ANSI)
ISO 2551 Machine-made Textile Floor Coverings -- Determination of Dimensional Changes Due to the
Effects of Varied Water and Heat Conditions ISO 2551 (Aachen Test). (Previously DIN 54318, Aachen
Dimensional Stability Test)
- 1.2.3 American Society of Testing and Materials (ASTM)
ASTM D1335 Standard Test Method for Tuft Bind of Pile Yarn Floor Coverings
ASTM D2859 Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering
Materials
ASTM D3676 Standard Specification for Rubber Cellular Cushion Used for Carpet or Rug Underlay
ASTM D3936 Standard Test Method for Resistance to Delamination of the Secondary Backing of Pile Yarn
Floor Covering
ASTM D5116 Standard Guide for Small-Scale Environmental Chamber Determinations of Organic
Emissions from Indoor Materials/Products
ASTM D5252 Standard Practice for the Operation of the Hexapod Drum Tester ASTM D5417 Standard
Practice for the Operation of the Vetterman Drum Tester
ASTM E648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant
Heat Energy Source
ASTM E662 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
- 1.2.4 Carpet and Rug Institute (CRI)
CRI Indoor Air Quality Testing Program
CRI TM101 Assessment of Carpet Surface Appearance Change CRI TM102 Fluorochemical Finishes
CRI 104 Standard for Installation of Commercial Carpet CRI Plus Green Label Plus Certified Carpet and
Adhesives.
- 1.2.5 Consumer Product Safety Commission (CPSC) CPSC FF-1-70 Methenamine Pill Test
- 1.2.6 National Fire Protection Association (NFPA) NFPA 101 Life Safety
NFPA 253 Standard Method of Test for Critical Radiant Flux of Floor Covering Systems using a Radiant
Heat Energy Source

1.3 **Submittals**

- 1.3.1 The following shall be submitted in accordance with Section 01 78 10 - Submittals:
- 1.3.2 Product Data: Submit manufacturer's product literature and installation instructions for each type of carpeting material and installation accessory required.
- 1.3.3 Samples:
- 1.3.3.1 Submit manufacturer's standard size samples showing full range of colors, textures and patterns available for each type of carpet tile required.
- 1.3.3.2 Submit a minimum of four 18-inch square samples for each type of carpet tile required. Submit samples that are large enough to show pattern repeat if beyond an 18-inch sample dimension.
- 1.3.3.3 Submit samples of each type exposed edge stripping, vinyl base, and accessory item.
- 1.3.4 Certification:
- 1.3.4.1 Submit certificate stating that the manufacturer and installer comply with Quality Assurance requirements.
- 1.3.4.2 Submit manufacturer's certificate stating that materials furnished comply with specified requirements. Include supporting independent certified laboratory testing data indicating that material meets specified test requirements.
- 1.3.4.3 Submit Material Safety Data Sheet (MSDS) for adhesives, leveling compounds, and primers required.
- 1.3.4.4 Submit written warranty information stating compliance with requirements.
- 1.3.5 Sustainability:
- 1.3.5.1 Submit manufacturer's documentation of recycled content for each product.
- 1.3.5.2 Submit documentation of manufacturer's buyback and/or recycling program.
- 1.3.5.3 Submit manufacturer's documentation that carpet, cushion and adhesives meet the Carpet and Rug Institutes (CRI) plus certification or comply with the following total volatile organic compounds (VOC) emissions criteria:
- 1.3.5.3.1 Carpet not to exceed 0.5 milligrams per square meter per hour.
- 1.3.5.3.2 Cushion not to exceed 1.0 milligrams per square meter per hour.
- 1.3.5.3.3 Adhesive not to exceed 10.0 milligrams per square meter per hour.
- 1.3.6 Maintenance Instructions: Submit manufacturer's printed instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under anticipated traffic and use conditions. Include precautions against materials and methods which may be detrimental to finishes and performance.

1.4 **Quality Assurance**

- 1.4.1 Manufacturer Qualifications: Firm with not less than 5 years of production experience, whose published literature clearly indicates general compliance of products with requirements of this section.
- 1.4.2 Installer Qualifications: Firm with not less than 5 years of experience in installation of commercial carpet tile of type, quantity and installation methods similar to work of this section.
- 1.4.3 Labeling: A label meeting the Federal Labeling Requirements, as stated in the Textile Products Identification Act under the Federal Trade Commission, shall be attached to the certification samples and the products delivered.
- 1.4.4 For each colorway, per floor, furnish carpet tile from one dye lot only.

1.5 Delivery, Storage and Handling

- 1.5.1 Deliver materials to site in original factory wrappings and containers, clearly labeled with identification of manufacturer, brand name, quality or grade, fire hazard classification, and lot number or provide independent certificates.
- 1.5.2 Store materials in original undamaged packages and containers, inside a well ventilated area protected from weather, moisture, soiling, extreme temperatures, humidity; laid flat, blocked off ground to prevent sagging and warping. Maintain temperature in storage area above 40° F.
- 1.5.3 Do not stack packages higher than recommended by manufacturer.
- 1.5.4 Comply with instructions and recommendations of manufacturer for special delivery, storage, and handling requirements.
- 1.5.5 Extra Materials; On projects over 100 square yards, furnish an additional 3 percent of carpet to be stored on site for maintenance/replacement needs. Additional carpet shall be packaged for storage to prevent damage from sagging, warping, and other deleterious effects.

1.6 Sequencing and scheduling

- 1.6.1 Coordinate work of this section with other work to ensure that installed carpeting materials are not damaged or soiled.

1.7 Project Conditions

- 1.7.1 Environmental Limitations: Do not install carpet tile until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for project when occupied for its intended use.
- 1.7.2 Do not install carpet tile over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer and in compliance with the values outlined in 3.01A of this document.
- 1.7.3 When demountable partitions or other items are indicated for installation on top of carpet tile, install carpet tile before the installation of these items.

1.8 Warranty

- 1.8.1 Warranties shall cover all labor and materials, including labor and installation costs involved to replace defective product and workmanship. All warranty items are full term, not pro-rated.
- 1.8.2 General Warranty: Special warranties specified in the Article shall not deprive the Tenant of other rights the Tenant may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- 1.8.3 Special Carpet Tile Warranty: Written warranty, signed by carpet tile manufacturer agreeing to replace carpet tile that does not comply with requirements or that fails within specified warranty period. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, and delaminating.
- 1.8.3.1 Warranty Period: minimum, non-prorated 15 years, from date of construction complete.

1.8.4 Special Installation Warranty: Written warranty, signed by carpet tile installer and general contractor agreeing to correct faulty workmanship.

1.8.4.1 Installation Warranty Period: 2 years from date of construction complete.

PART 2 PRODUCTS

2.1 **Manufacturers**

2.1.1 Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include, but are not limited to, those listed below. **Alternates must be equivalent to specification in Finishes Schedule.**

2.1.1.1 Mohawk Group ([Commercial Carpet & Hard Surface Solutions | Mohawk Group](#))

2.1.1.2 Mannington Mills Inc. (www.mannington.com)

2.1.1.3 Milliken Contract Carpets (www.milliken.com)

2.1.1.4 Shaw Contract Group (www.shawcontract.com)

2.1.1.5 Tandus Centiva – A Tarkett Company (www.tandus-centiva.com)

2.1.1.6 Interface Company (www.interfaceinc.com)

2.2 **Materials**

2.2.1 Compatibility: Provide carpet, adhesives, and other related materials that are compatible with one another and with substrates under conditions of service and application.

2.2.2 Product Requirements must be equivalent to: Refer to drawings and Finishes Schedule.

2.2.3 All materials must be 100% recyclable.

2.3 **Manufactured Units**

2.3.1 Product shall have a lead-time of not more than six (6) weeks from the time the dealer receives the order to the time the Tenant receives the product.

2.3.2 Patterns and colorways shall be available for a minimum of ten (10) years.

2.3.3 All product within the same floor of a project shall be from the same dye lot.

2.4 **Accessories**

2.4.1 Carpet Edge Guard, Nonmetallic: Extruded or molded heavy-duty vinyl or rubber carpet edge guard of size and profile required with minimum 2-inch wide anchorage flange; colors compatible with carpet furnished.

2.4.2 Cutback Underlayment and Patching Compound as per Manufacturer's recommendation.

2.4.3 Base: See Finishes Schedule.

2.4.4 Miscellaneous Materials: As recommended by manufacturers of carpet and other carpeting products for intended application.

2.4.5 Releasable Adhesive for Carpet: Provide water-resistant, low VOC (not to exceed 10.0 milligram per square meter per hour), non-staining type as recommended by carpet manufacturer which complies with flame spread rating required for carpet installation.

2.4.6 Concrete Sealer: Provide concrete sealer compatible with carpet backing material and adhesive.

2.5 **Source Quality Controls**

- 2.5.1 Flammability (Radiant Panel ASTM-E-648) \geq 0.45 (Class I).
- 2.5.2 Smoke Density (NFPA-258-T or ASTM-E-662) \leq 450.
- 2.5.3 Methenamine Pill Test (CPSC FF-1-70 or ASTM D 2859) Self-Extinguishing.
- 2.5.4 Lightfastness (AATCC 16E) \geq 4.0 at 80 hrs.
- 2.5.5 Crocking (AATCC 165) \geq 4.0 wet or dry.
- 2.5.6 Static Electricity (AATCC-134) 20% R.H., 70° F. \leq 3.5 KV, Permanent Conductive Fiber.
- 2.5.7 Dimensional Stability - Aachener Test (DIN Standard 54318) \leq 0.2%.
- 2.5.8 Appearance Retention Rating (CRI TM101) Heavy Use.
- 2.5.9 Turf Bind: ASTM D1335.
- 2.5.10 Delamination Resistance: ASTM D3936.
- 2.5.11 Fluorochemical Finish: CRI TM-102.
- 2.5.12 Indoor Air Quality: ASTM D5116.
- 2.5.13 Pile Fiber Identity: AATCC 20.
- 2.5.14 Backing Material Identity: AATCC 20.
- 2.5.15 Attached Backing:
 - 2.5.15.1.1 Thickness: ASTM D3676.
 - 2.5.15.1.2 Volume Density: ASTM D3676.
 - 2.5.15.1.3 Compression Resistance: ASTM D3676.
 - 2.5.15.1.4 Compression Set: ASTM D3676.
- 2.5.16 Test in accordance with NFPA 253 (ASTM E-648) when applying the floor finish requirements of the Life Safety Code (NFPA 101) to DOE Facilities.
- 2.5.17 Carpets and rugs should have a critical radiant flux not less than the following: -0.45 watts per square centimeter in areas unprotected by an automatic fire suppression system; and -0.22 watts per square centimeter in areas protected by an automatic fire suppression system.

PART 3 EXECUTION**3.1** **Examination**

- 3.1.1 Examine substrates for moisture content alkaline presence and other conditions under which carpet tile is to be installed. Provide Calcium Chloride test results to verify amount of moisture in all new or questionable existing slabs. Calcium Chloride shall be less than or equal to three (3) pounds per one thousand (1000) square feet in 24 hours. Alkalinity testing shall result in a pH range of 5–9. Notify CPM in writing of conditions detrimental to proper completion of the work. Do not proceed until unsatisfactory conditions have been corrected.
- 3.1.2 Field verify all dimensions and other work conditions affecting the installation of carpet tile.

3.2 **Preparation**

- 3.2.1 General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
- 3.2.1.1 Concrete shall be cured, clean and dry before installation proceeds.
- 3.2.1.2 Repair minor holes, cracks, depressions or rough areas using floor patching/leveling compound that is compatible with the adhesive to be used. Protrusions over 1/32 inch shall be leveled. Large patched areas shall be primed.
- 3.2.1.3 Whenever a powdery or porous surface is encountered, a primer compatible with the adhesive shall be used to provide a suitable surface for glue-down installation.
- 3.2.1.4 Remove existing brass utility caps and install SNL-furnished grout fill caps; grout level with existing substrate.
- 3.2.1.5 Remove grease, oils, loose particles, paint, dirt, curing and parting agents, and all other foreign substances. Clear away debris and scrape up cementitious deposits from surfaces to receive carpet tile; vacuum clean immediately before installation.
- 3.2.1.6 Subfloor shall be level and smooth and free from scaling and irregularities per Carpet and Rug Institute acceptable standards (CRI 104).
- 3.2.1.7 Coordinate carpet installation with any underfloor electrical/telephone/data so conductors and cables are pulled prior to carpet installation. Accessories (floor power/communications monuments) shall be installed on top of carpet after installation.
- 3.2.1.8 Sequence carpet tile installation with other work to minimize possibility of damage and soiling of carpet during remainder of construction period.
- 3.2.1.9 Maintain room temperature at minimum 65 degrees F for at least 24 hours prior to installation and relative humidity at approximately that at which the area is to be maintained.
- 3.2.2 Concrete (No Previous Flooring Material): Apply a concrete sealer coat at the rate recommended by the sealer manufacturer. Use thin, fast drying primers that are compatible with adhesives. Apply adhesive only after primer is completely dry.
- 3.2.3 Concrete (Previous Flooring Materials Removed): Remove existing adhesive by grinding with a concrete grinding machine and moist sand. Do not use solvents to remove adhesive. Apply concrete sealer at rate recommended by the sealer manufacturer. Use thin, fast drying primers that are compatible with adhesives. Completely cover area with cutback neutralizer per manufacturer's recommendations.
- 3.2.4 Wood: Patch all surface irregularities and seal with wood sealer as recommended by manufacturer.
- 3.2.5 Vinyl Tile: Replace all loose, missing, and broken tiles with tiles of equal thickness making note of any special requirements with respect to asbestos on the Jobsite Hazard Evaluation. Strip existing tile of wax, dirt and other foreign substances. Completely cover area with cutback neutralizer per manufacturer's recommendations.
- 3.2.6 Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 **Installation**

- 3.3.1 General: Comply with CRI 104, Section 13, "Carpet Modules (Tiles)," and carpet tile manufacturer's written instructions, except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.
- 3.3.1.1 Field verify all dimensions and other work conditions affecting the installation of carpet tile.

- 3.3.1.2 Unless otherwise noted or approved on drawings, begin laying tile at centerline.
- 3.3.1.3 Comply with carpet tile instructions for direction of carpet tile. Unless otherwise noted on drawings, align pattern and pile in the same direction, parallel to the centerline of the area or room.
- 3.3.1.4 Extend carpet tile under open-bottomed obstructions and under removable flanges and furnishings, and into alcoves and closets of each space. Existing systems furniture shall be raised or removed to accommodate continuous carpet installation.
- 3.3.1.5 Provide cut-out where required, and bind cut edges where not concealed by protective edge guards or overlapping flanges.
- 3.3.1.6 Install carpet edge guard where edge of carpet is exposed; anchor guards to substrate. Use full-length strips only.
- 3.3.1.7 Expansion Joints: Do not bridge building expansion joints with carpet tile; provide for movement.
- 3.3.1.8 Carpet tile shall be free from movement when subjected to traffic.
- 3.3.1.9 Do not use pieces smaller than 1/3 of a standard tile without prior approval by the SDR.
- 3.3.1.10 Provide mockup for approval by SDR of special cuts/effects such as mitered corners at borders or graphic patterns that are prepared and installed onsite.
- 3.3.1.11 Where there are floor finish material changes at doors, place centerline of abutting materials below door.
- 3.3.2 Glue Down Installation:
- 3.3.2.1 Fit sections of carpet tile into each space prior to application of adhesive. Trim edges.
- 3.3.2.2 Apply a full spread of adhesive uniformly to substrate in accordance with manufacturer's instructions unless otherwise indicated by SDR. Follow MSDS instructions for ventilation requirements. Butt carpet tile edges tightly together to form seams without gaps. Butt edges tightly to vertical surfaces. Eliminate air pockets and ensure uniform bond. Remove adhesive promptly from face of carpet tiles.
- 3.3.2.3 Self-adhesive installation: Install per manufacturer's recommendation.
- 3.3.2.4 Miscellaneous Installation, Stairway Carpeting: Install per manufacturer's recommendation. Provide vinyl nosing at each riser. Match adjoining carpet installation.
- 3.3.2.5 Install vinyl base after completion of carpet work. Use adhesive recommended by vinyl base manufacturer.
- 3.3.2.6 Coordinate adhesive blocking areas with SDR when floating carpet tile over access flooring.
- 3.4 Cleaning and Protecting**
- 3.4.1 Remove and dispose of debris and recycle all unusable scraps.
- 3.4.2 Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer. Replace carpet tile where blemishes cannot be removed. Trim protruding face yarn from carpet tile surface. Vacuum carpet tile using commercial quality vacuum cleaner with face-beater element.
- 3.4.3 Protect installed carpet tile to comply with CRI 104, Section 15, "Protection of Indoor Installations."
- 3.4.4 Protect installation with a heavy, non-staining building paper. Do not use a moisture barrier such as plastic film. Maintain protection intact until construction complete.

END OF SECTION

PART 1 GENERAL**1.1 Related Work**

1.1.1 Section 09 21 10 Gypsum Board.

1.1.2 Section 09 96 00 Painting.

1.2 References

1.2.1 American Society for Testing and Materials (ASTM):

1.2.1.1 ASTM E84-00, Surface Burning Characteristics of Building Materials.

1.2.2 Canadian General Standards Board (CGSB):

1.2.2.1 CGSB 1-GP-119M, Primer-Sealer, Wall, Interior Latex Type.

1.2.2.2 CGSB 41-GP-30M-82 Wall Coverings, Vinyl-Coated Fabrics.

1.2.3 Master Painters' Institute (MPI):

1.2.3.1 Architectural Painting Specification Manual.

1.2.4 Underwriters Laboratories of Canada (ULC):

1.2.4.1 List of Materials and Equipment.

1.3 Submittals

1.3.1 Submit copies of the wall covering manufacturer's installation and maintenance instructions, including precautions to be followed in use of cleaning materials which might damage the material in accordance with Section 01 70 00 – Operations and Maintenance Manual.

1.4 Quality Assurance

1.4.1 Wall covering subcontractor shall have a minimum of five years experience in successful application of wall covering in large institutional or commercial projects.

1.4.2 Comply with requirements of Master Painters Institute (MPI) "Painting Specifications Manual" as a minimum. Where differences between these specifications, the MPI Manual, and the Manufacturers recommended practices occur, the Manufacturers recommended practices shall govern.

1.5 Delivery, Storage & Handling

1.5.1 Store wall covering in a clean and dry area where temperatures are maintained at a minimum of 7°C, with normal humidity. Do not store rolls of material in an upright position (on end).

1.5.2 Take all necessary precautionary measures to minimize risk of fire where adhesives and solvents are stored and used.

1.6 Project Conditions

1.6.1 Maintain surfaces and materials at 16°C minimum for 3 days before application and continuously thereafter.

1.6.2 Ensure that moisture content of substrate meets the requirements of the wall covering manufacturer's installation instructions.

- 1.6.3 Provide a minimum of 540 lx/m² (40 f.c.) of illumination on surfaces to be finished.
- 1.6.4 Acceptable tolerances for flatness of surfaces to receive wall coverings are: not more than 1.5mm (1/16") in any 305mm (12"), and not more than 3mm (1/8") in any 3050mm (10'-0") tested with a straight edge.
- 1.6.5 Provide adequate and continuous ventilation during and after wall covering installation.
- 1.6.6 Schedule installation of wall covering as late as possible so as to prevent damage that may be caused during construction and moving of materials.
- 1.6.7 Install wall covering before the installation of plumbing fixtures, casings, bases, cabinets, hardware, etc.

PART 2 PRODUCTS

2.1 **Materials**

- 2.1.1 Acceptable materials: As listed in Finishes Schedule. No alternates accepted.
- 2.1.2 Colour as listed in Finishes Schedule. No alternates accepted.
- 2.1.3 Primer-Sealer: Conforming to CGSB 1-GP-119M, or other material as recommended by the wall covering manufacturer and required to meet flame spread requirements.
- 2.1.4 Adhesive: Mildew resistant as recommended by the wallcovering manufacturer and as required to minimize flame spread rating of wall covering material and to meet or exceed SCAQMD #1168.

PART 3 EXECUTION

3.1 **Examination**

- 3.1.1 Examine surfaces to receive wall covering and report surfaces which are not clean, true, and free of irregularities, or which have defects which will interfere with proper application of wall covering.
- 3.1.2 Proceed with installation of wall covering only on surfaces which are satisfactory.

3.2 **Preparation**

- 3.2.1 Fill and sand minor imperfections in gypsum board surfaces using joint cement. Prime surface in accordance with the wall covering manufacturer's instructions.
- 3.2.2 Prior to Work, remove all electrical plates and covers, surface hardware, fittings and fastenings and store in a protected area. After wall covering is applied, clean and replace.

3.3 **Installation**

- 3.3.1 Handle and apply wall covering in accordance with manufacturer's recommendations and MPI Manual.
- 3.3.2 Mix and apply adhesive in accordance with adhesive manufacturer's recommendations.
- 3.3.3 Use panels in exact order as cut from rolls. Use rolls in consecutive order as numbered by the manufacturer.
- 3.3.4 Trim textured patterns, or patterns which must be matched, on a flat work table using a straight edge and sharp knife.
- 3.3.5 Apply wall covering so that it will be smooth, secure, clean and without wrinkles, gaps or overlaps. Eliminate air pockets and ensure full bond to wall surface.
- 3.3.6 Do not make horizontal seams or cut at corners except where colour changes. Do not cut within 50mm (2") of an inside corner, or 150mm (6") of an outside corner.

- 3.3.7 Fill in spaces above and below windows, above doors, and similar areas in sequence from the roll.
- 3.3.8 Remove excess adhesive from each seam before proceeding to the next. Wipe seam clean with a dry cloth towel.
- 3.4 Cleaning**
- 3.4.1 Clean wall coverings of all adhesives, dust, dirt and other contaminants.
- 3.4.2 Remove debris and leave areas neat and clean.

END OF SECTION

PART 1 GENERAL**1.1 DESCRIPTION OF WORK**

- A. Work Included: Provide labour, materials and equipment necessary to complete the work of this Section including the following:
- 1) Lighting - Baffle w/ Integrated Lighting
 - 2) Ceiling - Baffle
 - 3) Wall - Square Acoustic Tile
 - 4) Wall - Slat Wall Acoustic Panel
 - 5) Accessories: Hardware

1.2 SUBMITTALS

- A. Product Data: Submit for each product indicating materials, dimensions, profiles, textures (where applicable), and colours. Include installation instructions.
- B. Shop Drawings: Submit shop drawings indicating plans, elevations, details of construction, relationship with adjacent construction, and installation method.
- C. Verification Samples: Submit 2 3"x4" samples of each colour and thickness of material for this project.
- D. Product test reports from a qualified independent testing laboratory showing compliance of each component with requirements indicated.
- E. Maintenance and cleaning documentation.

1.3 QUALITY ASSURANCE

- A. Manufacturer: Two (2) Year Warranty

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Immediately upon delivery, contractor must open crate and inspect goods prior to signing the bill of lading. This must occur regardless of any visible signs of external damage to the crating material. Ensure identification labels remain intact. Freight damage is not the responsibility of manufacturer. If damage is found, contractor must sign for the freight as damaged and the driver must acknowledge that the contractor is signing for damaged freight. It is the responsibility of the contractor to file any and all freight claims resulting from this process.
- B. Storage and Handling: Store materials in a dry area indoors, protected from damage and in accordance with manufacturer's instructions. Do not stack skids.

1.5 WARRANTY

- A. Warranty: Provide two (2) year warranty against defects in manufacturing.

PART 2 PRODUCTS**2.1 MANUFACTURERS**

- A. Basis-of-Design: EzoBord, www.EzoBord.com
- 1) Canada: Ayrsonics Inc., 825 Trillium Drive, Kitchener ON N2R 1J9, 1-844-441-1122, sales@ayrsonics.com
 - 2) USA: Ayrsonics Midwest LLC, 820 Tollgate Road, Elgin, IL 60123, 1-800-517-0686, sales.amw@ayrsonicsusa.com
 - 3) USA: Ayrsonics Southeast LLC, 15 Enterprise Way, Dahlonaga, GA 30533, 706-539-4711, sales.ase@ayrsonicsusa.com
 - 4) USA: Ayrsonics Southwest LLC, 8934 Eton Ave, Canoga Park, CA 91304, 213-833-9700, sales.asw@ayrsonicsusa.com
 - 5) United Kingdom: EzoBord UK Ltd., Unit 20, Westwood Business Park, Margate, Kent, CT9 4JJ, England, +44 1843-264027, sales@EzoBord.co.uk
- B. Substitutions: Requests for substitution and product approval in compliance with the specifications must be submitted in writing and in accordance with the procedures outlined in Division 1, Section "Substitution Procedures". Approval of requests is at the discretion of the interior designer, owner, and their designated consultants.

- C. Lighting - Baffle w/ Integrated Lighting: Rail Direct by EzoBord or approved equal
- 1) Description: Acoustic ceiling light
 - 2) Thickness: 3.2" (75 mm)
 - 3) Height: 8" (203 mm)
 - 4) Length: 5' (1524 mm)
 - 5) Colour/Finish: As selected from manufacturer's full range of standard colours, woodgrain colours, and finishes
 - 6) Product Properties:
 - a) Composition: PET exterior, metal core with electronic light components
 - b) Stiffness: 70 Shore Durometer
 - c) Surface: Tackable, impact-resistant, bacteria-resistant, moisture-resistant
 - d) VOCs and Formaldehyde: None
 - e) Fire Testing: ASTM E 84 Class A / CAN ULC S102
 - f) Sound Absorption: NRC 0.80 minimum
- D. Ceiling - Baffle: Curv Ceiling Baffles by EzoBord or approved equal
- 1) Description: Rail Baffle
 - 2) Thickness: 3.2" (81 mm)
 - 3) Height: 8" (203 mm)
 - 4) Length: 5' (1524 mm) and 8' (2438 mm). Refer to drawings and finishes schedules.
 - 5) Style: Rectangle.
 - 6) Colour: As selected from manufacturer's full range of standard colours, woodgrain colours, and finishes
 - 7) Product Properties:
 - a) Composition: 100% polyester with +/- 50 percent recycled PET fibre
 - b) Stiffness: 70 Shore Durometer
 - c) Surface: Tackable, impact-resistant, bacteria-resistant, moisture-resistant
 - d) VOCs and Formaldehyde: None
 - e) Fire Testing: ASTM E 84 Class A / CAN ULC S102
 - f) Sound Absorption: NRC 0.80 minimum
- E. Wall – Square Acoustic Tile: Geo Tile by EzoBord or approved equal
- 1) Description: Geometric acoustic tiles
 - 2) Thickness: 1/2" (12mm)
 - 3) Shape: Square
 - 4) Size: 12" (305 mm)]
 - 5) Colour: As selected from manufacturer's full range of standard colours and finishes
 - 6) Edge options: Straight
 - 7) Product Properties:
 - a) Composition: 100% PET (minimum 50% recycled content)
 - b) Stiffness: 70 Shore Durometer
 - c) Surface: Tackable, impact-resistant, bacteria-resistant, moisture-resistant
 - d) VOCs and Formaldehyde: None
 - e) Fire Testing: ASTM E 84 Class A / CAN ULC S102
 - f) Sound Absorption: NRC 0.80 minimum
- F. Wall – Slat Wall Acoustic Panel: Balsa by EzoBord or approved equal
- 1) Description: Three-dimensional slat wall acoustic panel
 - 2) Thickness: 1" (24 mm) (1/2" (12 mm) + 1/2" (12 mm))
 - 3) Pattern: Premium
 - 4) Colour: As selected from manufacturer's full range of standard colours, woodgrain colours, and finishes
 - 5) Product Properties:
 - a) Composition: 100% PET (minimum 50% recycled content)
 - b) Stiffness: 70 Shore Durometer
 - c) Surface: Tackable, impact-resistant, bacteria-resistant, moisture-resistant
 - d) VOCs and Formaldehyde: None
 - e) Fire Testing: ASTM E 84 Class A / CAN ULC S102
 - f) Sound Absorption: NRC 0.80 minimum

- G. Accessories: As applicable to the project and listed below.
 - 1) Hardware: provide as required per manufacturer's recommended installation methods.

PART 3 EXECUTION**3.1 EXAMINATION**

- A. Examine existing conditions to determine that they are suitable for installation. Proceed with installation only when unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Install units in accordance with manufacturer's instructions, approved submittals, and in proper relationship to adjacent construction.

3.3 ADJUSTING AND CLEANING

- A. Adjust units for proper position, uniform appearance and operation.
- B. Clean exposed and semi-exposed surfaces using materials acceptable to manufacturer.

END OF SECTION

PART 1 GENERAL**1.1 SECTION INCLUDES**

- A. Acoustical cotton wall panels and accessories for ceiling installation.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1) ASTM C423: Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
 - 2) ASTM C518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
 - 3) ASTM C1338: Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings
 - 4) ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 5) ASTM E795: Standard Practices for Mounting Test Specimens During Sound Absorption Tests
 - 6) ASTM E1477: Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers
- B. California Department of Public Health (CDPH)
 - 1) CDPH Standard Method V1.2-2017: Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers
- C. International Code Council (ICC)
 - 1) ICC IBC: International Building Code

1.3 SUBMITTALS

- A. Product Data: Manufacturer's data sheet and installation instructions.
- B. Samples: Submit, at minimum, a 4" x 4" sample for each type of specified acoustical panel.
- C. Test Reports: Upon request, submit certified test reports to verify specified product performance.

1.4 MAINTENANCE MATERIAL

- A. Extra Materials:
 - 1) Extra materials shall be from the same production run as the original materials.
 - 2) Extra materials shall remain in the manufacturer's original packaging and given to the building owner upon substantial completion of the work. Store extra materials per instructions as described in storage and handling requirements.

1.5 QUALITY ASSURANCE

- A. Qualifications:
 - 1) Manufacturers: Provide acoustical ceiling panels from a single manufacturer.
 - 2) Installers: Utilize an installer having demonstrated experience on projects of comparable size and complexity.
- B. Performance Requirements:
 - 1) Surface Burning Characteristics: Acoustical panels to perform as specified when tested in accordance with ASTM E84. Acoustical panel surface burning performance should comply with the International Building Code and other local building code requirements.
 - 2) Acoustical Characteristics: Acoustical panels to perform as specified when tested in accordance with ASTM C423.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Storage and Handling Requirements:
 - 1) Handle panels carefully to avoid any damage.
 - 2) Store panels indoors in a clean, cool, dry place, and out of direct sunlight.
 - 3) Store panels in a space where the ambient temperature and humidity conditions are being maintained at the levels indicated for the project when occupied for its intended use.

1.7 SITE CONDITIONS

- A. Ambient Conditions:
- 1) Maintain ambient temperature and humidity conditions at levels indicated for the project when occupied for its intended use.
 - 2) Do not install products under environmental conditions outside manufacturer's recommended limits.
- B. Existing Conditions: Do not install ceiling panels until space is enclosed and weather proofed, and wet work is completely dry.

1.8 WARRANTY

- A. Provide manufacturer's written product warranty per Section 01 77 00 – Closeout Procedures.

PART 2 PRODUCTS**2.1 MANUFACTURERS**

- A. Acoustical Solutions Phone: 800-782-5742 contact jcox@acousticalsolutions.com
- B. Substitutions: Requests for substitution and product approval in compliance with the specifications must be submitted in writing and in accordance with the procedures outlined in Division 1, Section "Substitution Procedures". Approval of requests is at the discretion of the interior designer, owner, and their designated consultants.

2.2 DESCRIPTION

- A. Product: Ecosorpt Ceiling Panels by Acoustical Solutions or approved equal
- B. Product Options:
- 1) Panel Composition: Bonded acoustical cotton
 - 2) Panel Density: 3 lb. pcf
 - 3) Panel Thickness: 1"
 - 4) Panel Size: 24" x 48"
 - 5) Edge Detail: Square
 - 6) Color: Black
 - 7) Mounting Method: Per manufacturer's recommended installation method
- C. Product Performance:
- 1) Acoustical Performance
 - a) Noise Reduction Coefficient (NRC) per ASTM C423: 0.80 minimum
 - 2) Surface Burning Performance
 - a) Fire Rating per ASTM E84: Class A
 - 3) Material Property Performance
 - a) Light Reflectance per ASTM E1477: White – 89; Light Gray – 37
 - b) VOC Emissions per CDPH Standard Method V1.2-2017: Pass
 - c) Fungal Growth per ASTM C1338: Pass (no fungal growth)
 - 4) Thermal Resistance (R-Value) per ASTM C518: 1" – 3.8; 2" – 7.5

2.3 ACCESSORIES

- A. Attachment hardware for ceiling panels as specified by manufacturer for installation.

PART 3 EXECUTION**3.1 EXAMINATION**

B. Verification of Conditions:

- 1) Examine surfaces scheduled to received furred out or directly attached acoustical units for unevenness, irregularities or dampness that would affect quality and execution of work.
- 2) All wet work in the installation area must be complete, cured, and dry prior to installation.
- 3) Wall assembly shall be complete, inspected, and accepted before ceiling work begins.

3.2 INSTALLATION

- A. Comply with manufacturer's instructions and recommendations for installation of ceiling panels and with industry standards.

3.3 CLEANING

- A. Clean surfaces of panels per manufacturer's instructions or recommendations.
- B. Remove and replace damaged or discolored material and material that cannot be properly cleaned.

3.4 PROTECTION

- A. Protect installed work from damage due to subsequent construction activity, including temperature and humidity limitations and dust control, so that the work will be without damage and deterioration at the time of acceptance by the owner.

END OF SECTION

PART 1 GENERAL**1.1 Related Work**

- 1.1.1 Work to comply with Division 1 General Requirements.
- 1.1.2 Finish Carpentry: Section 06 20 00.
- 1.1.3 Architectural Woodwork: Section 06 41 11.
- 1.1.4 Miscellaneous Metals: Section 05 90 00.
- 1.1.5 Wood Doors: Section 08 14 16.
- 1.1.6 Steel Doors & Frames: Section 08 12 13.

1.2 Samples

- 1.2.1 Submit duplicate 300 x 300mm sample panels of each paint type specified in accordance with Section 01 78 10.
- 1.2.2 Use 12.7mm thick lumber in species specified for wood finishes and 12.7mm thick wallboard for paint finishes over smooth surfaces and 300mm length of glassfiber reinforced gypsum bulkhead.
- 1.2.3 Before commencing applications, prepare appropriate walls and apply finish of each paint to full wall panels, for Consultant's approval under Tenant lighting conditions.

1.3 Environmental Requirements

- 1.3.1 Do not apply paint finish in areas where dust is being generated.
- 1.3.2 Confirm with Landlord when volatile or toxic materials are required. Application times may be restricted.

PART 2 PRODUCTS**2.1 Materials**

- 2.1.1 Qualified products: only paint materials listed on the CGSB Qualified Products List are acceptable for use on this project.
- 2.1.2 Paint materials: to CGSB Standards listed in Finishing Formulae.
- 2.1.3 Paint materials for each coating formulae to be products of a single manufacturer.

PART 3 EXECUTION**3.1 Preparation of Surfaces**

- 3.1.1 Prepare wood surfaces to CGSB 85-GP-1M.
 - 3.1.1.1 Use vinyl sealer over knots resinous areas.
 - 3.1.1.2 Apply wood paste filler to nail holes and cracks.
 - 3.1.1.3 Tint filler to match stains for stained woodwork.
- 3.1.2 Touch up shop paint primer on steel with CGSB 1-GP-40M to CGSB 85-GP-14M.
- 3.1.3 Prepare galvanized steel and zinc coated surfaces to CGSB 85-GP-16M.
- 3.1.4 Prepare concrete surfaces to CGSB 85-GP-31M.
- 3.1.5 Prepare concrete floors to CGSB 85-GP-32M.
- 3.1.6 Prepare plaster and wallboard surfaces to CGSB 85-GP-33M. Fill minor cracks with plaster patching compound.
- 3.1.7 Vacuum fibre acoustic tile and insulation covering surfaces.
- 3.1.8 Prepare copper piping and accessories to CGSB 85-GP-20M.

3.2 Application

- 3.2.1 Sand and dust between each coat to remove defects visible from distance up to 1.5m.
- 3.2.2 Finish bottoms, edges, tops and cutouts of doors and transoms after fitting as specified for door surfaces.
- 3.2.3 Finish tops of cabinets and projecting ledges, both above and below sight lines as specified for surrounding surfaces.
- 3.2.4 Finish closets and alcoves as specified for adjoining rooms.

3.3 Mechanical and Electrical Equipment

- 3.3.1 Paint exposed conduits, pipes, hangers and other mechanical and electrical equipment occurring in finished areas as well as inside cupboards and cabinet work. Colour and texture to match adjacent surfaces, except as noted otherwise.
- 3.3.2 Keep sprinkler heads free of paint.
- 3.3.3 Paint inside of ductwork where visible with primer and one coat of matt black paint.
- 3.3.4 Paint disconnect switches for fire alarm system and exit light systems in red enamel.
- 3.3.5 Paint both sides and edges of fire retardent for equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.
- 3.3.6 Paint all mechanical and electrical equipment where specified on drawings.

3.4 **Interior Finishes**

- 3.4.1 For plaster and gypsum board walls apply: one coat primer-sealer CGSB 1-GP-119M-Amdt-Sep-80, two coats latex paint CGSB 1-GP-118M.
For paint types and finish: See Finishes Schedule.
- 3.4.2 For metal surfaces apply: one coat spot priming CGSB 1-GP-40M, one coat enamel undercoat CGSB 1-GP-38M, two coats semi-gloss enamel CGSB 1-GP-57M. Base building doors per door schedule and convector cabinets. For paint types and finish: See Finishes Schedule.

3.5 **Indoor Air Quality: VOC limits**

- 3.5.1 V.O.C. emissions from paints must not exceed GS-11, January 1997 requirements.
- 3.5.2 Anticorrosive coatings must be less than GS-03 May 1993 requirements.
- 3.5.3 Interior paints or coatings such as primer, under coating, sealers and clear wood finishes not covered by GS-11 or GS-03 must meet or exceed the VOC content limits of SCAQMD Rule #1113 November 1996 requirements.

END OF SECTION

PART 1 GENERAL**1.1 Work Included**

- 1.1.1 Work to comply with Division 3 General Requirements.
- 1.1.2 Provide all labour, equipment and services to supply and install concrete sealers, and preparation work required and/or indicated on the drawings and specified herein.

1.2 Submittals

- 1.2.1 Submit manufacturer's product data and installation instructions.
- 1.2.2 Mock-Up: Prepare a test area minimum 2 by 2 feet in size to verify suitability of the sealer and final appearance.
- 1.2.3 Manufacturer: Minimum 10 years' experience producing concrete coatings.
- 1.2.4 Installer: Licensed installers experienced and trained in the use of specified products.
- 1.2.5 Suitability of Substrate: Concrete surface must be clean and dry with all stains, oil, grease, dust and dirt removed prior to application. A thorough pressure washing is highly recommended.

1.3 Handling, Delivery and Storage

- 1.3.1 Deliver materials and products in unopened factory labeled packages. Protect from damage.
- 1.3.2 Store in a safe place, out of direct sunlight. Keep containers tightly sealed. Do not allow product to freeze. Use within manufacturer's recommended shelf life, approximately 12 months.

PART 2 PRODUCTS**2.1 Materials**

- 2.1.1 Concrete Sealer: High-performance, non-yellowing, clear sealer with zero volatile organic compounds.
- 2.1.2 Performance: Concrete sealers shall meet or exceed the following:
- Coverage: As recommended by manufacturer.
 - Moisture Retention, Test ASTM C 309: 0.21 kg/m² at 200 ft² per gallon and 0.32 kg/m² at 300 ft² per gallon.
 - Gasoline Resistance: Slight dulling after 15-minute exposure (ponding).
 - T_g: 50°C.
 - Tukon Hardness: 30 minutes at 180°F, 9.3; 30 minutes at 300°F, 13.7.
 - Pencil Hardness: 30 minutes at 180°F, F; 30 minutes at 300°F, H.
 - Spray Conditions, Viscosity: 19 seconds, No. 2 Zhan cup.
 - Abrasion Resistance: 160 mg lost, CS-17 wheel, 1000 g load, 1000 cycles.
- 2.1.3 Anti-slip coating: anti-slip material applied in last coat of sealer. Sealant additive to be 'Sure-Step' by WR Meadows or approved equal. Install per manufacturer's specifications.

PART 3 EXECUTION**3.1 Preparation**

- 3.1.1 Inspection: Prior to start of application, inspect existing conditions to ensure surfaces are suitable for installation including the following:
- Surface is completely free of sealers, oils, dirt, paint, alkali, penetrating sealers and foreign materials that would prevent the sealer from penetrating the concrete surface.
 - Concrete has been swept clean.
 - Test area has been approved.

3.2 Application

- 3.2.1 Concrete Sealer: Strictly comply with manufacturer's installation recommendations including the following:
- a. Apply after stain has dried at rate recommended by manufacturer.
 - b. Clean surface as recommended by manufacturer.
 - c. All concrete flatwork designated as being sealed in the plans and specifications shall be sealed with 2-3 even coats of sealer, at the rate of approximately 150 to 200 square feet per gallon.

3.3 Cleaning and Protection

- 3.3.1 Protection: Do not cover, but protect floor area from paint and other contaminants that could inhibit the sealer.

END OF SECTION

PART 1 GENERAL**1.1 Section Includes**

1.1.1 Manually operated roller shades installed between existing window mullions.

1.2 References

1.2.1 American Society for Testing and Materials (ASTM).

1.2.2 ASTM International (ASTM).

1.2.3 Chemical Fabrics and Film Association (CFFA).

1.2.4 Underwriters Laboratories of Canada (ULC).

1.2.5 CAN/CSA C22.1-2012, Canadian Electrical Code, Part I.

1.2.6 National Electrical Manufacturers Association (NEMA).

1.2.7 National Fire Protection Association (NFPA).

1.2.8 Window Covering Manufacturers Association (WCMA).

1.3 Action Submittals

1.3.1 Product Data: Submit product data for each type of product including styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instruction for roller shades.

1.3.1.1 Submit on roller window shades manufacturer's letterhead of materials and accessories to be incorporated into Work and as follows:

1.3.1.1.1 MSDS report.

1.3.1.1.2 Include product name.

1.3.1.1.3 Include preparation instructions and recommendations and storage and handling requirements.

1.3.1.1.4 Include contact information for manufacturer and their representative for this Project.

1.3.2 Shop Drawings: Submit shop drawings showing location and extent of roller window shades.

1.3.2.1 Show fabrication and installation details for roller shades, including shade band materials, their orientation to rollers and their seam and batten locations.

1.3.3 Samples: Submit duplicate samples for each exposed product and for each colour and texture specified.

1.4 Informational Submittals

1.4.1 Test and Evaluation Reports: Submit evaluation service reports or other independent testing agency reports showing compliance with specified performance characteristics and physical properties.

1.4.2 Installer's Qualifications: Submit verification of experience.

1.4.3 Field Reports: Submit manufacturer's field reports within 3 days of each manufacturer representative's site visit and inspection.

1.4.4 Manufacturer's Certificate: Certify that Products meet or exceed specified requirement.

1.5 Quality Assurance

1.5.1 Installer's Qualifications: Company or individual specializing in work similar to work of this section with three years minimum documented experience.

1.6 Delivery, Storage and Handling

1.6.1 Delivery and Acceptance Requirements:

1.6.1.1 Deliver materials and accessories in roller window shades manufacturer's original packaging with identification labels intact and in sizes to suit project.

1.6.2 Storage and Handling Requirements: Store materials off ground in dry location and protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

1.6.3 Packaging Waste Management:

1.6.3.1 Remove waste packaging materials from site and dispose of packaging materials at appropriate recycling facilities.

PART 2 PRODUCTS**2.1 Performance Requirements**

2.1.1 Surface-Burning Characteristics: To CAN/ULC S102.

2.1.1.1 Flame-Spread Index: 25 maximum.

2.1.1.2 Smoke-Developed Index: 450 maximum.

2.2 Roller Shades

2.2.1 Chain-and-Clutch Operating Mechanisms: With continuous-loop-bead chain and clutch that stop shade movement when bead chain is released; permanently adjusted and lubricated.

2.2.1.1 Bead Chains: Manufacturer's standard:

2.2.1.1.1 Loop Length: Full length of roller shade.

2.2.1.1.2 Limit Stops: Provide upper and lower ball stops.

2.2.1.1.3 Chain-Retainer: None.

2.2.2 Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection.

2.2.2.1 Include permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.

2.2.2.2 Roller Mounting Configuration: Single roller.

2.2.2.3 Roller Drive-End Location: Right side of inside face of shade.

2.2.2.4 Direction of Shadeband Roll: Regular, from back of roller.

2.2.3 Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.

2.2.4 Roller-Coupling Assemblies: Ensure assemblies are co-ordinated with operating mechanism and designed to join up to three inline rollers into multiband shade that is operated by one roller drive-end assembly.

- 2.2.5 Shadebands:
 - 2.2.5.1 Shadeband Material: Light-filtering fabric.
 - 2.2.5.2 Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
 - 2.2.5.1.1 Type: Manufacturer's standard.
 - 2.2.5.1.2 Colour and finish: As selected by Consultant from manufacturer's standard range.
- 2.2.6 Installation Accessories:
 - 2.2.6.1 Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
 - 2.2.6.1.1 Shape: L-shaped.
 - 2.2.6.1.2 Height: Manufacturer's standard height required to conceal roller and shadeband when shade is fully open.
 - 2.2.6.2 Endcap Covers: To cover exposed endcaps.
 - 2.2.6.3 Closure Panel and Wall Clip: Removable aluminum panel designed for installation at bottom of site constructed ceiling recess or pocket or for snap-in attachment to wall clip without fasteners.

2.3 **Shadeband Materials**

- 2.3.1 Shadeband Material Flame-Resistance Rating: To CAN/ULC S102.
- 2.3.2 Light-Filtering Fabric: Woven Fabric, stain and fade resistant.
 - 2.3.1.1 Source: Roller-shade manufacturer.
 - 2.3.1.2 Type 1% fabric – North, South, East & West elevations.

2.4 **Roller-Shade Fabrication**

- 2.4.1 Product Safety Standard: Fabricate roller shades to WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.
- 2.4.2 Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 23 deg. C:
 - 2.4.2.1 Between (inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 6.0mm at each side or 13mm total, plus or minus 3.0mm
 - 2.4.2.1.1 Length equal to head-to-sill or floor dimension of opening in which shade is installed less 6mm, plus or minus 3.0mm
- 2.4.3 Shadeband Fabrication: Fabricate shadeband without battens or seams to extent possible except as follows:
 - 2.4.3.1 Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacing along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of material.
 - 2.4.3.2 Railroaded Materials: Railroad material where material roll width is less than the required width of shadeband and where indicated.
 - 2.4.3.2.1 Include battens and seams as required by railroaded material to produce shadebands with full roll-width panel(s) plus, if required, one partial roll-width panel located at top of shadeband.

PART 3 EXECUTION**3.1 Installers**

3.1.1 Use only installers with three years minimum experience with work similar to work of this section.

3.2 Examination

3.2.1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for roller window shade installation in accordance with manufacturer's written recommendations.

3.2.1.1 Visually inspect substrate in presence of Consultant.

3.2.1.2 Verify accurate locations of building electrical systems.

3.2.1.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2.2 Start of roller window shade installation indicates installer's acceptance of substrate conditions.

3.3 Installation

3.3.1 Handle and apply wall covering in accordance with manufacturer's recommendations and MPI Manual.

3.3.2 Mix and apply adhesive in accordance with adhesive manufacturer's recommendations.

3.3.3 Use panels in exact order as cut from rolls. Use rolls in consecutive order as numbered by the manufacturer.

3.4 Cleaning

3.4.1 Progress Cleaning: Perform cleanup as work progresses.

3.4.1.1 Leave work area clean at end of each day.

3.4.2 Final Cleaning:

3.4.2.1 Clean roller-shade surfaces after installation in accordance with manufacturer's written recommendations.

3.4.2.2 Remove surplus materials, rubbish, tools, and equipment.

3.4.3 Waste Management:

3.4.3.1 Collect recyclable waste and dispose of or recycle field generated construction waste created during construction or final cleaning related to work of this Section.

3.4.3.2 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.5 Protection

3.5.1 Protect roller window shades from damage during construction period.

3.5.2 Repair damage to adjacent materials caused by roller window shades installation.

END OF SECTION

1. PART ONE – GENERAL**.1 SECTION INCLUDES**

- .1 Sound Masking Systems

.2 REFERENCES

- .1 ASTM E1374-18e1 – Standard Guide for Office Acoustics and Applicable ASTM Standards
- .2 ASTM E1573-18 – Standard Test Method for Measurement and Reporting of Masking Sound Levels Using A-Weighted and One-Third Octave Band Sound Pressure Levels
- .3 ASTM E1130-16 – Standard Test Method for Objective Measurement of Speech Privacy in Open Plan Spaces Using Articulation Index
- .4 ASTM E2638-10 (2017) – Standard Test Method for Objective Measurement of Speech Privacy Provide by a Closed Room
- .5 Acoustical Design of Conventional Open Plan Offices, Canadian Acoustics, Vol 27, no. 3, 2003 (NRCC-46274).
- .6 UL 62368-1 / CSA C22.2-62368-1: Audio/Video, Information And Communication Technology Equipment - Part 1: Safety Requirements
- .7 UL 2043 / CAN/ULC-S142:2016: Fire test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces
- .8 FCC Part 15 (2014) Radio Frequency Devices Compliance
- .9 EMC 2004/108/EC – Electromagnetic Compatibility Directive Compliance

.3 SUBMITTALS

- .1 Product Data: Manufacturer's Specifications and Installation Instructions.
- .2 System Design: schematics of the system showing quantity and location of components, related cabling and accessories.

.4 CLOSEOUT SUBMITTALS

- .1 Product Data: Manufacturer's Specifications and Installation Instructions.
- .2 System Design: As-built schematics of the system showing quantity and location of components, related cabling and accessories.
- .3 Warranty Documents: warranty documents covering the system components and start dates.

.5 QUALITY ASSURANCE

- .1 Manufacturer qualifications: Company specialized in manufacturing sound masking systems with pertinent references in similar projects.
- .2 System Design: Performed by an approved manufacturer representative.
- .3 Installer Qualifications: Approved by manufacturer representative and are trained with the specified components or have demonstrated experience with the installation of similar products to those specified.
- .4 Source all sound masking equipment from a single supplier.
- .5 System Adjustment: Done by an approved manufacturer representative or trained contractor.

.6 DELIVERY, STORAGE AND HANDLING

- .1 Protect equipment from moisture during shipping, storage and handling.
- .2 Deliver in manufacturer's original unopened and undamaged packages with manufacturer's labels legible and intact.
- .3 Inspect manufacturer's packages upon receipt.
- .4 Store products as required by the manufacturer.
- .5 Handle packages carefully.

.7 WARRANTY

- .1 Provide a written warranty that the system components installed shall be free from defects in parts or assembly for a 5-year period from date of first use (the date of system initialization).

2. PART TWO – PRODUCTS**.1 MANUFACTURERS**

- .1 Soft dB Inc.
1040, Avenue Belvédère,
Suite 215 Québec, G1S
3G3 Paul Barnard
647.668.4063
p.barnard@softdb.com
www.softdb.com
- .2 Other manufacturers that meet all performance parameters.

.2 REGULATORY TESTING AND CERTIFICATIONS

- .1 The relevant system components shall conform to:
 - .1 UL 62368-1 / CSA C22.2-62368-1: Audio/Video, Information And Communication Technology Equipment - Part 1: Safety Requirements
 - .2 UL 2043 / CAN/ULC-S142:2016: Fire test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces
 - .3 FCC Part 15 (2014) Radio Frequency Devices Compliance
 - .4 EMC 2004/108/EC – Electromagnetic Compatibility Directive Compliance
 - .5 EN 55022 Information technology equipment - Radio disturbance characteristics – Limits and methods of measurement
 - .6 EN 55103-1: Electromagnetic compatibility - Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use - Part 1: Emissions.
 - .7 EN 55103-2: Electromagnetic compatibility - Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use - Part 2: Immunity.
 - .8 EN61000-6-1: Electromagnetic compatibility (EMC) - Generic standards - Immunity for residential, commercial and light-industrial environments.

.3 DESIGN AND PERFORMANCE REQUIREMENTS

.1 System Architecture

- .1 The system shall be of a SmartSMS-Net Soft dB networked decentralized architecture with addressable masking devices distributed throughout the installation area.
- .2 The sound masking system shall be arranged into zones that will allow the system to be fine-tuned and comply with the performance specifications defined in Section 1.3.D.4.
 - a. A zone is defined as an acoustically uniform environment. The typical number of speakers per zone varies from 1 to 6 speakers depending on the design. The number of speakers per zone in the open area can be increased up to 30 speakers as long as the system meets the performance and requirements defined in Section 3.4.1. Sound Masking Systems Acoustical Performance.
 - b. Each zone shall be individually addressable and controllable for both volume and spectrum for fine tuning of the system.
 - c. Separate zones are required based on the room sizes and architectural layout. Similarly sized and designed private offices or meeting rooms can share the same sound masking zone as long as the system is tuned to meet the sound level defined in 3.4.1. Sound Masking Systems Acoustical Performance in concordance with ASTM E1573-2018
 - d. An automatic equalization process shall be used for each zone.

.2 System Generating System

- .1 The system shall use digital signal processing (DSP) technology for masking sound generation and output adjustment of masking signals.
- .2 Sound masking generator shall include an automatic calibration process on 340 narrow bands or third-octave bands from 100Hz to 6.3 kHz based on DSP technology.
- .3 The masking sound shall be generated via a truly-random, non-deterministic digital process with no repeat cycle.
- .4 The system shall provide independently controllable masking zones that efficiently allow the ability to control and monitor the operation of each zone and provide:
 - a. A third-octave equalizer per zone with minimum 23 bands, ranging from 63Hz to 10 kHz;
 - b. Possibility to select specific spectrum for each masking zone;
 - c. Definition of the sound masking spectrum by increment of 0,1 dB in each 1/3 octave band;
 - d. An independent masking volume control providing minimum 0.1 Dba volume increments and an output range of 35 to 85 dBA @ 1m from the loudspeaker;
 - e. A temporary mute function for the masking output;
 - f. The ability to completely disable the masking output;
 - g. Possibility to provide a masking volume ramp-up function of up to 4 weeks to facilitate the introduction of the system in the buildings that are already occupied.
 - h. The system shall provide a function to allow a gradual ramp up of masking volume each time power is applied

.3 System Control and Software

- .1 The system shall include LAN, USB and Wireless communication capability. The configuration and the adjustment of the system shall be made with a PC or a tablet connected by a wireless connection. The wireless connection is required only during the configuration of the system (not required for operation) and can be turned off if required.
- .2 The sound masking system shall include graphical software interface that integrates the design, setup, and calibration stages directly on the office layout plan.
- .3 When adjustment needs to be made on the sound masking system, the operator shall be able to make the changes directly from the area that needs modification. The operator control PC or tablet shall be able to communicate with the system by wireless.
- .4 The sound masking system will allow the ability to individually adjust the volume on each speaker in the case of non-conformity.

.4 Adaptive Volume Control for Sound Masking Level (Optional)

To optimize the efficiency of sound masking and the acoustical comfort of the occupant, the sound masking system shall be able to include an adaptive volume control system for each zone.

- .1 This adaptive volume system should allow an automatic real-time volume adjustment of the masking sound level based on the level of ambient noise in zones.
- .2 Upon completion of installation, and final setup the supplier shall provide a report to client of the sound masking systems acoustical performance and range.
- .3 The ambient noise shall be measured with sensors installed in the zones. The controller shall have the ability to increase or lower the masking sound according to the variation of the ambient noise in the zones by measuring in real time the discrepancies between L10% and L90% of the ambient noise.
- .4 Variations rates shall be adjustable from 0.01dB/sec to 0.1 dB/sec steps and the variation should be updated at least every 15 sec to avoid any perceptible change in masking sound level.
- .5 The minimum and maximum sound masking level of the adaptive volume control shall be programmable.
- .6 The typical adaptive volume limits shall be 45 dBA +/-2 dB and shall be fully programmable. This typical set up shall allow the system to decrease to 43 dBA when the space is quiet and allow it to increase in real-time by non-perceptible increments to a maximum of 47 dBA during high-activity periods.
- .7 The masking volume in each zone shall be controlled independently.
- .8 History of the active volume control shall be recorded on a 7 days period to allow the performance of the system to be analyzed.

.5 Calendar-Based Programmable Timer Function

- .1 The system shall include a calendar-based programmable timer function to:
 - a. Put the masking system in sleep mode during nighttime for energy saving;
 - b. Provide an acclimation of the office workers over days or weeks;
 - c. To provide masking volume adjustment according to day time activity (if the system do not include the automatic adaptive volume control technology;
- .2 Timer schedules shall be assigned to an individual or group of sound masking zones.
- .3 The system shall allow independent timer schedules for each day of the week.

- .4 The system shall allow variable rates of volume adjustment as low as 0.01 dB/sec.
- .6 In-Room occupant Control (Optional)
 - .1 The system shall allow for the option to include a specified number of wall mounted, in-room controls giving the facility occupants manual controls over the loudspeaker volume in designated room or zone.
- .7 Diagnostic Performance
 - .1 Upon initial configuration, the system shall allow the ability to monitor that each networked device is communicating with the project manager software.
 - .2 The system shall provide a function for locating loudspeakers from below the ceiling, producing an audible tone burst.
 - .3 Diagnostics shall be viewable from the project manager software.
 - .4 The check-up list to monitor shall be selected by user.
 - .5 The system shall provide the ability to automatically generate, store and/or send via an external network monitoring reports with the status of all networked devices. The system shall be able to
 - a. Send report of errors to client-defined email addresses
 - b. Store reports in client-defined folder
 - .6 The system shall be capable of generating reports in printed and editable electronic formats.
- .8 Security Performance
 - .1 The system shall provide:
 - a. Password-protected access to the project manager software.
 - b. Storage of settings in memory in each networked masking device, which shall be maintained during power outages
 - .2 The sound masking system shall be designed to perform as a stand-alone system therefore totally independent from the customer's LAN infrastructure and therefore not gather, store or communicate any relevant information except from low level electronic signals from the controllers to the speakers or sensors.
 - a. The only exception allowed would be when the customer requires that the sound masking system to interface with their Building Automation Software then the sound masking system shall offer an option to connect the controller to the customer's network through an RJ-45 connector or Wi-Fi.

3. PART THREE – EXECUTION

.1 EXAMINATION

- .1 Ensure that facility build out is at a stage suitable for the system installation.
- .2 Ensure that facility is constructed according to plans, including wall locations, ceiling types and plenum barriers.
- .3 Ensure that the plenum height is appropriate as per manufacturer's recommendations and as per plan.
- .4 Ensure power requirements have been provided as per plan.

- .5 Ensure sufficient space for centrally located components is available as per plan and manufacturer's specifications.
- .6 Ensure any third-party components required to be interfaced with the system have been provided.

.2 INSTALLATION

- .1 Design system according to manufacturer's specifications.
- .2 Follow all applicable codes for the area.
- .3 Follow manufacturer's recommendations regarding installation.
- .4 Follow the system design for location of loudspeakers and wiring.
- .5 Record any necessary changes to the system design on the plan.
- .6 Ensure that supplementary materials used meet applicable safety standards.
- .7 Obtain necessary permits for installation work.

.3 SITE QUALITY CONTROL

- .1 Ensure that plenum heights meet the minimum recommended by the manufacturer for the loudspeakers.
- .2 Ensure that the distance between the top of the loudspeaker and the deck meets manufacturer's minimum specifications.
- .3 Ensure that loudspeakers are suspended in a level manner.
- .4 Minimize obstructions to loudspeakers, to the extent possible.
- .5 Ensure cables are properly supported in the ceiling.
- .6 Ensure cables are securely terminated.

.4 SYSTEM STARTUP AND COMMISSIONING**.1 Sound Masking Systems Acoustical Performance**

- .1 The preferred target sound masking frequency spectrum to be used shall be the one shown in Table 1 and in Acoustical Design of Conventional Open Plan Offices, Canadian Acoustics, Vol 27, no. 3, 2003 (NRCC-46274) for each zone
- a. The frequency contour provided shall be maintained at different dBA target levels by equally applying the positive or negative difference, between the nominal 45 dBA level and the target dBA level, to each of the one-third octave frequency band's dB level, so as to equally shift the entire contour. (e.g. A target level of 42 dBA, will required shifting the entire 45 dBA spectrum down equally by 3 dB in each of the 1/3 octave frequency bands)

Table 1: Optimal Sound Masking Spectrum (ref. Bradley, NRCC-46274 report)
– Nominal 45 dBA Contour

1/3 Octave Band Center Frequency	1/3 Octave dB Sound Levels (overall = 45 dBA nominal)
Hz	dB
100	42.5
125	42
160	41.5
200*	41.5
250*	41
315*	40.5
400*	39.5
500*	38.5
630*	37.5
800*	37
1,000*	35.5
1,250*	33.5
1,600*	31
2,000*	28.5
2,500*	26.5
3,150*	23.5
4,000*	21.5
5,000*	19.5

* The Articulation Index (which defines speech intelligibility) uses only the frequencies noted above

- .2 Base line masking sound levels for each location type shall be as follows:
 - a. **45 dBA** in open plan areas. (or as defined by the acoustician)
 - b. **42 dBA** in enclosed rooms (or as defined by the acoustician)
- .3 The supplier shall setup the sound masking system to meet acoustical performance requirements when HVAC systems are functioning under what is considered a "normal" mode of operation for occupied periods.
 - a. It is the client's responsibility to ensure HVAC systems are operating as required during sound masking system's scheduled commissioning.
 - b. The supplier shall not be responsible to meet acoustical performance requirements in locations where, existing background noise exceeds sound masking spectrum levels, and/or where building design details or other constraints prevent its proper installation, setup and operation.
- .4 The spectrum should be verified and adjust to match target spectrum for every 100 square meters at a minimum in open area and in 15% of enclosed rooms with at least 1 measurement in each zone. The measurement shall be performed at spatially-representative locations and in at 1.05-1.35m above floor level and at least 1m away from demising partitions, walls, or large reflecting surfaces, in concordance with ASTM E1573-2018 measurement procedures.
- .5 After adjustment, the system shall provide spatial uniformity within the tolerances provided below when adaptive control is off:
 - a. Overall dBA levels measured within zones and in enclosed rooms shall be within **+/- 1 dBA**, of the specified target level for the combined mechanical and sound masking level;
 - b. Uniformity in any third-octave band shall vary no more than:
+/- 2 dB, from the 1/3 octave band contour levels defined in Table 1 from 100Hz to 200Hz;
+/- 1 dB, from the 1/3 octave band contour levels from 200Hz to 5000Hz;
 - c. In the situation where building background noise exceeds the target spectrum, special attention should be taken to identify the source.
- .6 Upon completion of installation, and final setup the supplier shall provide a report to client of the sound masking systems acoustical performance.

.5 DEMONSTRATION AND TRAINING

- .1 Demonstrate operational system to customer by walking the space.
- .2 Demonstrate functionality of the system to the customer or customer's representative.
- .3 Provide any training to customer's representative that may be required under the terms of the contract to maintain and/or operate the system or any optional devices.

.6 CLEANING AND WASTE MANAGEMENT

- .1 Ensure that empty packaging is removed. *** Please recycle ***
- .2 Ensure that any material waste is removed.
- .3 Ensure the system components are clean and presentable where required.