J-BLOCK RENOVATION
OSHAWA COMPUS

FOR

DURHAM COLLEGE

ISSUED FOR TENDER
01 DECEMBER 2021

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1.1 Work Under This Contract

.1 It is intended that Work supplied under this Specification shall be complete in every detail for purpose required. This Contract shall include by Contractor, materials not herein mentioned, but which may be found necessary to complete or perfect any portion of Work in accordance with requirements of this Specification.

1.2 Use of Premises and Site

.1 Confine Work to the area of the Project only.

1.3 Specifications

.1 Each Section of Division 1 is complementary to other Sections of Division 1 and shall be read together with other Sections.

.2 This Section co-ordinates, relates and governs Work of other Sections of the Specification.

.3 The Specifications are apportioned into Divisions and Sections for convenience but shall be read as a whole and neither such apportionment nor anything else contained in the Contract Documents places responsibility upon the Consultant to settle disputes among Subcontractors in respect thereof.

1.4 Examination of Site, Documents, Surfaces and Conditions

.1 Carefully examine Place of the Work and investigate, at no cost or risk to Owner, matters relating to nature of Work, means of access and egress, obstacles, rights and interests of other parties which may be interfered with during the execution of Work, conditions and limitations including obstructions, existing structures or facilities, local conditions, actual levels, character and nature of the Project, and any other consideration which may affect performance of the Work.

.2 Carefully examine extent of Work to be performed and matters which are referred to in the Contract Documents prior to start of Work.

.3 Examine Work to which Work is to be applied, anchored or connected, and relevant as-built conditions.

.4 Do not Work until unsatisfactory conditions are corrected to acceptance of Consultant, Contractor and concerned Subcontractors. Commencement of Work implies acceptance of surfaces and conditions.

1.5 Quantity of Items

.1 Where a component, device, item or part of materials or equipment is referred to in the singular number, such reference shall require the provision of as many components, devices, items or parts of material or equipment necessary to complete the Work.

1.6 Standards and Codes

.1 Contract Forms, codes, Specifications, standards, manuals and installation, application and maintenance instructions referred to in these Specifications, unless otherwise specified, amended or date suffixed, shall be latest published editions at Bid Closing Date.

1.7 Discrepancies

.1 Advise Consultant of any contradictions, discrepancies or errors that are found or noted.

.2 Advise Consultant if there is any doubt as to meaning or intent thereof in Contract Documents.

.3 Do not proceed until instructions/clarifications have been confirmed by Consultant. A failure to notify Consultant shall result in Contractor incurring responsibility for any resulting circumstances, conditions, expenses or cost.

1.8 Additional Definitions

Also refer to Definitions in CCDC 2 2008.

.1 Wherever words "approved", "review", "acceptance", "acceptable", "satisfactory', "selected", "directed", "required", "submit", or similar words or phrases are used in standards or elsewhere in Contract Documents, it shall be understood, that words "by (to) the Consultant" follow, unless context Provides otherwise.

.2 "Others" Defined: Others in Contract Documents refers to other trades within framework of this Contract. Any Work or material executed outside Contract is designated "NIC" (Not in Contract), "By Owner', or "By Other Contractors".

1.9 Setting Out the Work

1 Assume full responsibility for and execute complete layout of Work to required locations, lines and elevations.

1.10 Documents On Site

.1 Maintain at job site, one copy of each of following:

.1 Contract Documents including Drawings, Specifications, Addenda, and other modifications to the Contract.

.2 'Reviewed' or Reviewed as Modified Shop Drawings.

.3 Project Construction and Shop Drawing Schedules.

.4 Site Instructions, Change Orders, and Change Directives.

.5 Field Test Reports.

.6 Reports by Authorities having Jurisdiction.

.7 Building and other applicable permits.

.8 Material Safety Data Sheet pursuant to WHMIS (Occupational Health & Safety Act).

.9 As-built Drawings recording as-built conditions, instructions, changes for structure, equipment, wiring, plumbing and Divisions 15 and 16, prior to being concealed.

.10 Copies of applicable codes and standards.

.2 Make above material available to Consultant at their request.

1.11 Overloading

.1 Take precautions and preclude overloading of any part of structure, falsework, formwork or scaffolding during progress of the Work, and make good damage resulting from such overloading.

1.12 Inserts, Anchors and Fasteners

.1 Use only factory made, threaded or toggle type inserts as required for supports and anchors, properly sized for load to be carded. Place inserts only in members of main structure and not in any finishing material.

.2 Where inserts cannot be placed, use factory made expansion shields for light weights only.

.3 Fasteners stressed in withdrawal are not acceptable, except where otherwise specifically shown.

.4 Ensure that metal fastenings are of same materials as metal components being anchored or of a metal which will not set up a galvanic action causing damage to the fastening or metal component under moist conditions.

.5 Fastenings for prefinished materials shall be of concealed type unless otherwise indicated.

.6 Metal fastenings and accessories shall be same texture, colour and finish as material on which they occur.

1.13 Trademark and Labels

.1 Trademarks and labels, including applied labels, shall not be visible in finished Work in finished areas.

.2 Remove trademarks or labels by grinding, if necessary, paint out where particular surface is being painted or, if on plated parts, replace with new plain plated or non-ferrous metal parts.

.3 The exceptions to this requirement are trademarks and labels which are essential to obtain identification of mechanical, electrical or other equipment for maintenance and replacement purposes and for mandatory fire ratings.

1.14 Powder Actuated Fasteners

.1 The use of Powder Actuated Fasteners is not acceptable without prior consent from the Owner.

1.15 Use of Premises Prior to Substantial Performance

.1 Owner shall have right to enter and occupy building, in whole or in part, for purpose of placing fittings and equipment, or for other use, prior to Substantial Performance if, in opinion of the Consultant, such entry and occupancy does not prevent or interfere with the Contractor in performance of the Work. Such entry shall in no way be considered as an acceptance of Work in whole, or in part, nor shall it imply acknowledgement that terms of Agreement are fulfilled.

1.16 Interferences

.1 Coordinate placement of equipment to ensure that components will be properly accommodated within spaces Provided prior to commencement of Work.

.2 Take complete responsibility for remedial Work that results from failure to coordinate any aspect of Work prior to its fabrication/installation.

.3 Ensure that accesses and clearance required by jurisdictional authorities and/or for easy maintenance of equipment are Provided in layout of equipment and services.

END OF SECTION

PART 1 - GENERAL

1.1 Approved Alternates and Approved Equals

.1 Named Product 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. Be responsible for costs and modifications associated with the inclusion of named Product alternate or equal at no additional cost to the Owner.

.2 The process for proposing and approving alternates or equals shall be the same process as for proposing and approving substitutions (refer to paragraph 1.2 below).

.3 Review of alternates or equals shall not be considered during the Bidding Period.

.4 Confirm delivery of specified items prior to proposing alternates or equals.

1.2 Substitutions

.1 Submission of substitutes

.1 Proposal for substitutions of Products and materials must be submitted in accordance with procedures specified in this section.

.2 Consultant may review submissions, if directed by Owner, but in any case with the understanding that the Contract Time will not be altered due to the time required by the Consultant to review the submission and by the Contractor to implement the substitution in the Work.

.3 Consultant’s services to review substitutions will be performed on an additional services basis to their contract with the Owner. Costs of these services will be discounted from any reductions in the Contract Price that might be forthcoming form the substitution. Therefore, to be acceptable, a substitution must present a reduction in the construction cost at least equal to the cost to the Owner of the Consultant’s additional services to review the substitution. Contractor shall cover directly costs and administration associated with courier services, reproduction costs, and other direct costs associated with these substitution reviews.

.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 Consultant's services to evaluate the substitution, the Consultant will request the Owner's direction to proceed with evaluation.

END OF SECTION

1.0 General

.1 Erect Work in compliance with Contract Documents and be responsible for delays or costs resulting from failure to inspect or co-ordinate, and for any replacement or corrective work required.

1.1 Superintendence

.1 Provide full time on site superintendent personnel and supporting staff with proven experience in erecting, supervising, testing and adjusting projects of comparable nature and complexity.

.2 Site superintendent shall have overall authority to speak for Contractor and represent Contractor.

1.2 Dimensions

.1 Verify dimensions on Site before commencing shop drawings. Before fabrication commences report discrepancies to Consultant in writing. Incorporate accepted variances on shop drawings and As-Built records.

1.3 Coordination

.1 Coordinate and co-operate with work forces to ensure that Work will be carried out expeditiously and in proper sequence.

.2 Make adjustments to allow adjustable work fit to fixed Work.

1.4 Dimension and Coordination

.1 Take necessary job dimensions for the proper execution of the work. Assume complete responsibility for the accuracy and completeness of such dimensions, and for coordination.

.2 Verify that work, as it proceeds, is executed in accordance with dimensions and positions indicated and maintain levels and clearances to adjacent work, as set out by requirements of Drawings, and ensure that work installed in error is rectified before construction resumes.

.3 Check and verify dimensions referring to work and interfacing of services. Verify with trade concerned such dimensions, when pertaining to work of other trades.

.4 **DO NOT SCALE** directly from Drawings. Obtain clarification from Consultant if there is ambiguity or lack of information on Drawings.

.5 Details and measurements of any work which is to fit or to conform with work installed shall be taken at Place of Work.

.6 Advise Consultant of discrepancies and omissions on Drawings and specifications which affect aesthetics, or which interfere with services, equipment or surfaces. Do not proceed with work affected by such items without clarification from Consultant.

END OF SECTION

PART 1 - GENERAL

1.1 Provide labour, Products, equipment, services tools and supervision necessary for submittals. Make submittals specified in this Section to Consultant unless otherwise specified.

.1 Verify accuracy and completeness of submittals prior to submission.

.2 Verify field measurements, field construction criteria, catalogue numbers and similar data.

.3 Co-ordinate each submittal with requirements of the Work and the Contract Documents.

.4 Notify Consultant in writing at time of submission, of any deviation in submittals from requirements of the Contract Documents.

1.2 Prepare a schedule identifying all submittals requested within the Contract Documents and corresponding issued dates for review by the Consultant.

1.3 Submit in accordance with dates established under Schedule of Submittals, fabrication, manufacture, erection and installation to provide adequate time for reviews, securing necessary approvals, possible revisions and resubmittals, placing orders, securing delivery and to avoid construction delays.

1.4 Accompany each submittal with a letter of transmittal containing all pertinent information required for identification and checking of submittals including but not limited to the following:

.1 Date of initial submission and date of each subsequent submission if required.

.2 Project title and Consultant’s project number.

.3 Names of:

.1 Contractor.

.2 Subcontractor.

.3 Supplier/manufacturer as applicable.

.4 Specification section numbers to which submission is related.

.5 Countersigned stamp of Contractor certifying that they have reviewed and accepted the submission.

PART 2 - PRODUCT DATA

2.1 Before delivery of Products to the Site, submit Product data for approval as specified in each section or as requested by the Consultant.

2.2 Submit manufacturer's Product data for systems, materials, and methods of installation proposed for use. Such literature shall identify systems, each component, and shall certify compliance of each component with applicable standards.

PART 3 - SAMPLES

3.1 Before delivery of Products to the Site, submit samples of Products as specified or as requested by the Consultant. Label samples as to origin and intended use in the Work and in accordance with the requirements of the Specification Sections. Samples must represent physical examples to illustrate materials, equipment or work quality and to establish standards by which completed Work is judged.

3.2 Ensure samples are of sufficient size and quantity, if not already specified, to illustrate:

.1 The quality and functional characteristics of Products, with integrally related parts and attachment devices.

.2 Full range of colours available.

3.3 Notify the Consultant in writing, at time of submission, of any deviations in samples from requirements of the Contract Documents, and state the reasons for such deviations.

3.4 Identify samples with Project name, Contract number, date, Contractor's name, number and description.

3.5 If samples are not acceptable, both samples will be returned. If samples are acceptable, one sample will be so indicated and returned. Be responsible for the cost of samples that are not accepted and for resubmission of samples.

3.6 Acceptable samples shall serve as a model against which the products incorporated in the work shall be judged.

3.7 Each Product incorporated in the Work shall be precisely the same in all details as the acceptable sample.

3.8 Should there be any change to the accepted sample, submit in writing for approval of the revised characteristics and resubmit samples of the Product for approval if requested.

3.9 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 by Consultant.

PART 4 - SHOP DRAWINGS

4.1 Arrange for the preparation of shop drawings as called for in the Contract Documents or as may be reasonably requested by the Consultant. The Contractor and each Subcontractor shall operate as experts in their respective fields and all shop drawings and samples shall conform to the requirements of the Contract Documents.

4.2 The term “shop drawings” means drawings, diagrams, schematics, illustrations, schedules, performance charts, brochures and other data which are required to illustrate details of the Work.

4.3 In addition to shop drawings specified in the specification sections, submit shop drawings required by jurisdictional authorities in accordance with their requirements.

4.4 Shop drawings for openings, sleeving and conduit

.1 Prior to preparation of shop drawings, coordinate sizes of all structural openings and sleeves with respective fabricators for mechanical ducting. Adjustments to the opening sizes indicated on the Contract Drawings shall not be made without the approval of the Consultant.

.2 Prior to detailing structural reinforcement on shop drawings, arrange for the Engineer of structure to review formed holes, recesses and sleeving. Completely dimension openings, recesses and sleeves and relate to suitable grid lines and elevation.

.3 Prior to forming of the structure, arrange for the preparation of shop drawings for review by the Consultant showing embedded conduit to be cast within the structure. Shop drawings shall include conduit from all sources.

4.5 Shop drawings shall indicate the following minimum criteria and any additional criteria indicated in the individual specification sections requiring shop drawings:

.1 Clear and obvious notes of any proposed changes from the Contract Documents.

.2 Fabrication and erection dimension.

.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, physical dimensions including thicknesses, 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 interconnection work.

.10 Assumed design loadings, and dimensions and material specifications for load-bearing members.

4.6 Include in shop drawing submissions detailed information, templates, and installation instructions required for incorporation and connection of the Work.

4.7 Before submitting to the Consultant, review all shop drawings to verify that the Products illustrated therein conform to the Contract Documents. By this review, the Contractor agrees that it has determined and verified all field dimensions, field construction criteria, materials, catalogue numbers and similar data and that it has checked and coordinated each shop drawing with the requirements of the Work and of the Contract Documents. The Contractor's review of each shop drawing shall be indicated by stamp, date and signature of a qualified and responsible person possessing the appropriate authorization.

4.8 Be responsible for dimensions to be confirmed and correlated at the Site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for coordination of the Work of all subtrades.

4.9 Submit shop drawings for the Consultant's review with reasonable promptness and in orderly sequence so as to cause no delay in the Work nor in the work of Other Contractors. At the time of submission, notify the Consultant in writing of any deviations in the shop drawings from the requirements of the Contract Documents. The Contractor will be held responsible for changes made from the Contract Documents which are not indicated or otherwise communicated in writing with the submission.

4.10 Drawings submitted by the Contractor as required herein are the property of the Owner who may use and duplicate such drawings where required in association with the Work.

4.11 Submit shop drawings, as indicated in each section of the Work, signed and sealed by a licensed Professional Engineer registered in the place of the Work.

4.12 Shop drawings shall have distinct, uniform letters, numerals and line thicknesses that will ensure the production of clear legible prints and also facilitate microfilming and reduced reproduction.

4.13 Submissions shall be on 8.5" x 11" or 11" x 17" page format. However, in instances where catalogue items are specified, three clean copies of the manufacturer's catalogue may be submitted.

4.14 Shop drawings shall contain the following identification:

- .1 Project name and Contract number.
- .2 Applicable 5-digit Contract Specification number describing the item.
- .3 Location (unit, level, room number, etc.).
- .4 Name of equipment or Product.
- .5 Name of Subcontractor or supplier.
- .6 Signature of Contractor certifying that Shop drawing is in conformance with Contract Documents.
- .7 On submissions subsequent to the first, the following additional identification:
  - .1 The revision number.
  - .2 Identification of the item(s) revised.

4.15 Dimensions and designations of elements shall be shown in the same system of measurement used on the applicable Contract Drawings.

4.16 The Consultant reserves the right to refuse acceptance of drawing submissions not meeting the above requirements.

4.17 The Consultant's review will be for conformity to the design concept and for general arrangement only and such review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the Contract Documents unless a deviation on the shop drawings has been approved in writing by the Consultant.

4.18 The Contractor shall make any changes in shop drawings which the Consultant may require consistent with the Contract Documents and re-submit unless otherwise directed by the

Consultant. **When re-submitting the shop drawings, the Contractor shall notify the Consultant in writing of any revisions other than those requested by the Consultant.**

4.19 Only drawings noted for revision and resubmission need be resubmitted.

4.20 File one copy of each submitted shop drawing at the Site.

4.21 Shop drawings submitted to Consultant that do not bear a stamp or are incomplete will not be reviewed and will be returned to Contractor, any delay in Construction Schedule as a result will be the full responsibility of the Contractor.

PART 5 - CERTIFICATES

5.1 Submit certificates that are required by authorities having jurisdiction or that are requested in the specification sections.

5.2 Clearly show on each certification the name and location of the Work, name and address of Contractor, quantity and date of shipment and delivery and name of certifying company.

5.3 Certificates shall verify that Products and/or methods meet the specified requirements and shall include test reports of acceptable testing laboratories to validate certificates.

5.4 Submit certificates in duplicate and signed by an authorized representative of the certifying company.

PART 6 - CERTIFICATION OF TRADESMEN

6.1 Provide certificates, at the request of the Consultant, to establish qualifications of personnel employed on the Work where such certification is required by authorities having jurisdiction, by the Consultant or by the Contract Documents.

END OF SECTION

PART 1- GENERAL

1.1 General Instructions

.1 Be responsible for inspection and testing as required by the Contract Documents, statutes, regulations, by-laws, standards or codes or any other jurisdictional authority. Give the Consultant timely notice of the readiness for inspection, date and time for such inspection for attendance by the Consultant.

.2 Verify by certification that specified products meet the requirements of reference standards specified in the applicable specification sections. Preserve all original labels, containers and packaging of products for review by Consultant.

.3 Conduct testing, balancing and adjusting of equipment and systems specified in applicable mechanical and electrical specifications sections by independent testing company.

1.2 Inspection and Testing by the Owner

.1 The Owner may appoint an independent inspection and testing company to carry out inspection and testing of the Work for conformance to the Contract Documents. Such costs for inspection and testing will be paid by the Owner. However, any additional inspection and testing due to non-conformance to the Contract Documents shall be at the Contractor's expense.

.2 Inspections and testing by the Owner will be promptly made. Uncover for examination any Work covered up prior to inspection or without approval of the Consultant. Make good such Work at no cost to the Owner.

.3 The Owner may inspect and test Products during manufacture, fabrication, shop testing, installation, construction and testing phases of the Contract. The Consultant will ascertain the quantity and quality of testing to be performed. Inspection and testing may be performed at the place of manufacture/fabrication, storage, or at the Site as designated by the Consultant. Where inspection and testing is done either during manufacture, fabrication, or at Site, ensure that proper facilities and assistance are provided.

1.3 Inspection and Testing

.1 Source and Field Quality Control specified in Other Sections:

.1 This Section includes requirements for performance of inspection and testing specified under Source Quality Control and Field Quality Control in other Sections of the specifications.

.2 Do not include in work of this Section responsibilities and procedures that relate solely to an inspection and testing company's functions that are specified in another Section which is paid for directly by the Owner.

.2 Do not limit responsibility for ensuring that products and execution of the work meet Contract requirements, and inspection and testing required to this end, to specified inspection and testing.

1.4 Qualifications of Inspection and Testing Companies

.1 Inspection and testing companies to be certified by the Standards Council of Canada.

.2 Companies engaged for inspection and testing shall provide equipment, methods of recoding and evaluation, and knowledgeable personnel to conduct tests precisely as specified in reference standards.

.3 If requested, submit affidavits and copies of certificates of calibration made by an accredited calibrator to verify that testing equipment was calibrated and its accuracy ensured within the previous twelve months.

1.5 Tolerances for Installation of Work

.1 Unless specifically indicated otherwise, work shall be installed plumb, level, square and straight.

.2 Unless acceptable tolerances are otherwise specified in specification sections or are otherwise required for proper functioning of equipment, site services, and mechanical and electrical systems:

.1 "Plumb and level" shall mean plumb or level within 1 mm in 1 m.

.2 "Square" shall mean not in excess of 10 seconds lesser or greater than 90 degrees.

.3 "Straight" shall mean within 1 mm under a 1 m long straightedge.

.4 "Flush" shall mean within:

.1 6 mm for exterior concrete, masonry, and paving materials.

.2 1 mm for interior concrete, masonry, tile and similar surfaces.

.3 0.05 mm for other interior surfaces.

.3 Allowable tolerances shall not be cumulative.

1.6 Reference Standards

.1 Perform inspection and testing in accordance with Standards quoted and as required by procedures described in specified reference standards that are applicable to the work being inspected and tested.

1.7 Responsibilities of the Contractor

.1 Be responsible for quality control methods and procedures to ensure performance of the work in accordance with the Contract Documents.

1.8 Responsibilities of Inspection and Testing Companies

.1 Determine from specifications and Drawings the extent of inspection and testing required for Work of the Contract. Subcontractors shall notify Consultant of any omissions or discrepancies in the work inspected and/or tested.

.2 Perform applicable inspection and testing described in the Specifications and as maybe additionally directed.

.3 Provide competent inspection and testing personnel when notified by the Contractor that applicable work is proceeding. Inspection personnel shall cooperate with the Consultant and Contractor to expedite the Work.

.4 Subcontractors shall notify the Consultant and Contractor of deficiencies and irregularities in the Work immediately when they are observed in the course of inspection and testing.

.5 Inspection and testing companies shall not perform or supervise any of the Contractor's work, and shall not authorize:

.1 Performance of work that is not in strict accordance with the Contract Documents.

.2 Approval or acceptance of any part of the Work.

1.9 Inspection and Testing Procedures

.1 Perform specified inspection and testing only in accordance with specified reference standards, or as otherwise approved.

.2 Observe and report on compliance of the Work to requirements of Contract Documents.

.3 Ensure that inspectors are on site or at fabricator's operations for full duration of critical operations, and as otherwise required to determine that the Work is being performed in accordance with the contract Documents.

.4 Identify samples and sources of materials.

.5 Review and report on progress of the work. Report on count of units fabricated and inspected at fabricator's operations.

.6 Observe and report on conditions of significance to work in progress at time of inspection or at fabricator's operations. Include where applicable and if critical to the work in progress:

.1 Time and date of inspection.

.2 Temperature of air, materials, and adjacent surfaces.

.3 Humidity of air, and moisture content of materials and adjacent materials.

.4 Presence of sunlight, wind, rain, snow and other weather conditions.

.7 Include in reports all information critical to inspection and testing.

.8 Ensure that only materials from the work and intended for use therein are tested.

.9 Determine locations for work to be tested.

1.10 Defects

.1 Defective products, materials and workmanship found at any time prior to Contract Completion will be rejected regardless of previous inspections, testing, and reviews of the Work. Inspections, testing, and reviews shall not relieve the Contractor from their responsibility, but are a precaution against oversight or error. Remove and replace defective and rejected products, materials, systems, and workmanship. Be responsible for delays and expenses caused by rejection.

END OF SECTION

1.0 GENERAL

1.1 DOCUMENTS

.1 This Section of the Specifications forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

1.2 REQUIREMENTS INCLUDED

.1 Barriers.

.2 Environmental Controls.

.3 Construction Aids.

.4 Use of the work.

.5 Traffic controls.

.6 Utilities.

.7 Protection.

.8 Office and sheds.

.9 Signs.

1.3 REMOVAL OF TEMPORARY CONSTRUCTION

.1 Temporary office facilities, toilets, barricades, storage sheds, utilities and other construction of temporary nature erected by the Trade Contractor shall be removed from the site by the Trade Contractor as soon as the progress of the Work will permit.

1.4 BARRIERS

.1 Exterior Hoarding: The Contractor will -

.1 Erect and maintain hoarding around perimeter of work site as required by governing authorities to protect the public, workers, public and private property from injury or damage.

.2 Provide barricades and covered walkways required by governing authorities for public rights-of-way.

.3 Provide barriers around trees and plants designated to remain. Protect from damage.

.2 Guard Rails & Barricades:

.1 The Contractor will administer and maintain a health and safety program. Contractor shall provide all perimeter guard rails and/or barricades to the building and at all floor openings, shafts and stairwells, etc. within the building as required by the Work. Such protection will be to the requirements of the Workers' Safety Insurance Board (WSIB).

.2 Trade Contractor shall remove and replace such guard rails and barricades, to accommodate the Work.

.3 Trade Contractor shall provide, maintain and adjust any other guard rails, barricades or safety platforms required by law and authorities having jurisdiction for protection of the Work and the workmen and for protection of the public.

1.5 ENVIRONMENTAL CONTROLS

.1 Weather Enclosures: The Contractor will provide weathertight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs as necessary to expedite the work.

.2 Dust Tight Screens:

.1 The Contractor will provide dust tight screens or partitions as necessary to localize dust generating activities, and for the protection of workers and finished areas of Work and the public.

.2 Trade Contractor shall relocate and maintain to accommodate the Work.

.3 Dust Prevention: Trade Contractor, where necessary, shall effectively water-sprinkle and dampen the workings, and roads used in the operation, and involved portions of the site with such frequency as will satisfactorily allay any dust during all hours that work is being performed.

.4 Noise Abatement: Trade Contractor shall comply with the requirements of Municipal and/or Provincial by-laws regarding noise abatement and shall take all necessary steps to ensure the generation and transmission of noise and vibration due to the work is kept to a minimum. Any such noise or vibration which is found to be objectionable shall be corrected at no additional cost to the Owner and to the satisfaction of the Contractor and the Consultant.

.5 Refer to specification 01350 for assembly requirements for dust proof screens.

1.6 USE OF THE WORK

.1 Site Storage/Loading:

.1 Contractor shall confine the Work and the operations of employees to limits indicated by the Contract Documents and as directed by the Owner and shall not unreasonably encumber the premises with products and materials.

.2 Contractor shall confine activities relevant to the work to areas within the designated working area. No fires, explosions or similar dangerous activities permitted on the site.

.3 Contractor shall conduct construction operations with minimum interference to adjacent roadways, sidewalks and access facilities in general and shall keep such areas free from materials, debris and equipment at all times.

.4 Contractor shall not load or permit to be loaded any part of the Work and existing structure with a weight or force that will endanger the Work and existing structure.

1.7 TRAFFIC CONTROL

.1 Access to Site:

.1 The Contractor will provide and maintain access road, sidewalk crossings, ramps and construction runways as may be required for access to the Work.

.2 Contractor shall co-operate and co-ordinate his operations with the Owner.

.3 Access to the site for all deliveries and removals shall be from Davenport Road only; access is not permitted from Designer’s Walk Lane to the east.

.4 Contractor is responsible for obtaining municipal Street Occupation Permit to temporarily occupy any portion of the public right of way during the Work.

.2 Public Traffic Flow:

.1 Contractor shall provide and maintain flagpersons, traffic signals, barricades and flares/lights/lanterns as required to perform the Work and protect the public.

.3 Construction Parking:

.1 Contractor shall be responsible for arranging their own parking requirements; parking shall not be provided by Owner.

1.8 TEMPORARY UTILITIES

.1 Sanitary Facilities:

.1 Contractor is permitted to use Owner’s sanitary facilities.

.2 Temporary Water

.1 Use of existing building water service shall be made available to the Contractor and shall be coordinated with the Owner prior to commencing work.

.3 Temporary Heating & Enclosure:

.1 Provide for the proper heating and drying out of the building until completion by the use of appropriate heating equipment. Do not use “salamanders’. Use forced hot air type heaters operated in well-ventilated locations. Protect the floors, walls and ceilings around the heating units. Ensure that no damage by staining result to finished floors during operation, servicing and refueling.

.2 Maintain the heated parts of the building(s) or temporary enclosures at not less than 50°F (10°C), or at such temperature specifically stated in the sections of the Specifications, for the proper installation of the various Products.

.3 Provide at the Place of the Work and ready for operation between at least October 15th and April 30th, temporary plant and equipment for heating materials and forms and for maintaining the proper temperature and humidity of the concrete during curing. Refer to and comply with the requirements of CSA A23.1/A23.2-00.

.4 Duct carbon dioxide gas (CO2) or other noxious or harmful gases from heaters to the exterior of the building(s).

.4 Temporary Power & Light:

.1 Use of existing electrical power shall be made available to the Contractor by the Owner.

.2 Comply with the requirements of codes, by-laws and regulations governing temporary power and lighting at the location of the Work.

.3 Contractor will provide a power source on each floor in a central location. Each Subcontractor shall provide required extension cords from location where power is provided to location where it is needed.

.4 Contractor will arrange for general temporary lighting throughout Work areas. Each Subcontractor shall provide special task lighting required in the execution of the Work.

.5 Provide sufficient lighting to ensure sufficient visibility for the proper execution, safety and inspection of the Work.

.6 Comply with Construction Safety Association's "Temporary Wiring Standards on Job Sites", the Ontario Electrical Code, and other authorities having jurisdiction.

.5 Temporary first Aid Facilities

.1 Provide site equipment and medical facilities necessary to supply first-aid service to injured personnel in accordance with regulations of the Worker’s Compensation Act.

1.9 PROTECTION

.1 Protection for Off-Site & Public Property:

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

.2 Fire Protection:

.1 Contractor shall provide and maintain temporary fire protection equipment during performance of Work required by insurance companies, governing codes, regulations, bylaws and authorities having jurisdiction.

.2 Open fires and burning of rubbish are not permitted on the site.

.3 Contractor shall take all necessary precautions to eliminate fire hazards and instruct Superintendent to make periodic inspections to ensure proper preventative measures are being complied with by all personnel working on the site.

.4 Paint and/or oil covered rags shall be stored in covered metal containers. Rubbish shall be removed daily, from building and site.

.5 Contractor shall comply with Provincial and Municipal fire safety requirements during the period of construction and other regulations pertaining to fire protection during construction work.

.6 Where torch cutting and electric welding are required by the Work, the trade concerned shall provide additional fire safety measures considered necessary to protect existing facilities from fire. A suitable fire extinguisher shall be provided by the applicable Trade Contractor adjacent to all welding operations.

.7 Precautions shall be taken at all times to prevent fire by spontaneous combustion.

.3 Protection of Building Finishes & Equipment:

.1 Contractor shall adequately protect his work at all stages of the operations and shall maintain the protection until his work is completed. Contractor shall remove and replace at his own expense any work and materials damaged, that cannot be repaired or restored to the Consultant's approval, due to inadequate protection being provided.

.2 Contractor shall be responsible for protection of existing work. If during the work, any existing work is damaged by the Trade Contractor, it shall be replaced without cost to the Owner and to the approval of the Consultant.

.3 Contractor shall provide, erect, and maintain adequate temporary barricades, warning signs, and lights for the protection of the public at all excavations, closures, detours, and points of danger where his work occurs outside the hoarding area.

.4 Security:

.1 Security for buildings and grounds will be provided by the Contractor.

1.10 OFFICES & SHEDS

.1 Offices & Sheds:

.1 Any temporary buildings, or other structures required by the Contractor, shall be provided by him in a condition and location acceptable to Owner. Contractor shall provide at his own expense, his own equipment for heating, lighting, plumbing and telephone for such buildings, subject to the approval of the Owner. Contractor may be required, at his own expense, to relocate his temporary building or buildings as often as required by the Owner to facilitate the efficient prosecution of the Work.

.2 First Aid: First aid facilities, including attendant, will be provided on the site by the Construction Manager, completely equipped in accordance with the requirements of the Workplace Safety Insurance Board (WSIB).

1.11 SIGNS & PUBLICITY

.1 Signs:

.1 Contractor will control the use of signs. Signs or advertising shall not be placed on site without the written prior approval of Owner.

.2 Trade signage shall not be erected or applied prior to approval of design and placement.

.2 Publicity: All publicity relating to this project is subject to the approval of the Owner and no mention of the project in advertising or articles in any publication will be permitted unless cleared through the Owner. Publicity or advertising implying endorsement of a product by the Owner will not be permitted.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Product quality, availability, storage, handling, protection, and transportation.

.2 Manufacturer's instructions.

.3 Quality of Work, coordination and fastenings.

.4 Existing facilities.

1.2 Reference Standards

.1 Canadian Construction Documents Committee (CCDC)

.1 CCDC 2-2008, Stipulated Price Contract.

.2 Within text of specifications, reference may be made to additional reference standards.

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

.4 If there is question as to whether any product or system is in conformance with applicable standards, the Consultant reserves right to have such products or systems tested to prove or disprove conformance.

.5 The cost for such testing will be born by Owner in event of conformance with Contract Documents or by Contractor in event of non-conformance.

.6 Conform to latest date of issue of referenced standards in effect on date of submission of Bids except where specific date or issue is specifically noted.

1.3 Quality

.1 Refer to CCDC 2, GC 3.9.

1.4 Availability

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.2 In event of failure to notify Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Consultant reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.5 Storage, Handling and Protection

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

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Remove and replace damaged products at own expense and to satisfaction of Consultant.

.9 Touch-up damaged factory finished surfaces to Consultant's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.6 Transportation

.1 Pay costs of transportation of products required in performance of Work.

.2 Transportation cost of products supplied by Owner will be paid for by Owner. Unload, handle and store such products.

1.7 Manufacturer's Instructions

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Consultant in writing, of conflicts between specifications and manufacturer's instructions, so that Consultant may establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Consultant to require removal and re-installation at no increase in Contract Price or Contract Time.

1.8 Quality of Work

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Consultant if required Work is such as to make it impractical to produce required results.

1.9 Co-Ordination

.1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.10 Concealment

1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

.2 Before installation, inform Consultant if there is interference. Install as directed by Consultant.

1.11 Remedial Work

.1 Refer to CCDC 2, GC 3.13.

1.12 Protection of Work in Progress

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

1.13 Existing Utilities

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants.

.2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Progressive cleaning.

.2 Final cleaning

1.2 Related Section

.1 Section 01 77 00 - Closeout Procedures.

1.3 Reference Standards

.1 Canadian Construction Documents Committee (CCDC)

.1 CCDC2 2008, Stipulated Price Contract

.2 Additional references as per documents/contract.

1.4 Project Cleanliness

1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.

.2 Remove waste materials from site at regularly scheduled times or dispose of as directed by Consultant. Do not burn waste materials on site, unless approved by Consultant.

.3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.4 Provide on-site containers for collection of waste materials and debris.

.5 Provide and use clearly marked separate bins for recycling.

.6 Remove waste material and debris from site and deposit in waste container at end of each working day.

.7 Dispose of waste materials and debris off site.

.8 Clean interior areas prior to start of finish work, and maintain areas free of dust and other contaminants during finishing operations.

.9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.10 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.5 Final Cleaning

.1 Refer to CCDC2, GC 3.14.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

1 Administrative procedures preceding preliminary and final inspections of Work.

1.2 Related Sections

.1 Section 01 78 00 - Closeout Submittals

1.3 References

.1 Canadian Construction Documents Committee (CCDC)

.1 As per documents CCDC 2-2008, Stipulated Price Contract.

.2 Additional references as per documents/contract.

1.4 Inspection and Declaration

.1 Contractor's Inspection: Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.

.2 Request Consultant's Inspection.

.2 Consultant's Inspection: Consultant and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.

.3 Completion: submit written certificate that following have been performed:

.1 Work has been completed and inspected for compliance with Contract Documents.

.2 Defects have been corrected and deficiencies have been completed.

.3 Equipment and systems have been tested, adjusted and balanced and are fully operational.

.4 Certificates required by Boiler Inspection Branch Fire Commissioner Utility companies have been submitted.

.5 Operation of systems have been demonstrated to Owner's personnel.

.6 Work is complete and ready for Final Inspection.

.4 Final Inspection: when items noted above are completed, request final inspection of Work by Owner, Consultant, and Contractor. If Work is deemed incomplete by Owner and Consultant, complete outstanding items and request re-inspection.

.5 Declaration of Substantial Performance: when Owner and Consultant consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance. Refer to CCDC 2, General Conditions Article GC 5.4 - Substantial Performance of Work for specifics to application.

.6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

.7 Final Payment: When Owner and Consultant consider final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. Refer to documents CCDC 2, General Conditions Article GC 5.7 and terms of the documents/contract for specifics to application. If Work is deemed incomplete by Owner and Consultant, complete outstanding items and request re-inspection.

.8 Payment of Holdback: After issuance of certificate of Substantial Performance of Work, submit an application for payment of holdback amount as per documents CCDC 2, General Conditions Article 5.5 and per the terms of the documents/contract.

END OF SECTION

PART 1 – GENERAL

1.1 Hand over to the Consultant comprehensive operations and maintenance manual and material suitable for the Owner's maintenance employees. Manuals shall cover all Products supplied and installed under the Contract.

1.2 Submit draft of the operation and maintenance manuals for the Consultant's review at least 15 days before testing systems and equipment, or as outlined in Supplemental Conditions 08800. Incorporate alterations and additions, as found to be necessary during testing, and prepare the final version of the manual from the corrected draft before Turnover.

1.3 Submit final version of operation and maintenance manuals prior to Contract Completion.

1.4 Testing of systems and equipment will not be deemed to be complete until the requisite number of copies of the final version of the manuals has been handed over to the Consultant.

1.5 If standard literature is incorporated into the operations and maintenance manual, any irrelevant information shall be deleted, or suitably noted.

1.6 The manuals shall have sufficient detail in order that the Owner can totally maintain the equipment without outside help.

1.7 Submit all material in English.

PART 2 – FORMAT

2.1 Organize data in the form of an instructional manual.

2.2 Provide both digital copy and hard copy as follows:

.1 Hard copy (1): Commercial quality, 219 x 279 mm, black 3-ring binder (thickness to suit).

.2 Digital copies (3): CD/DVD with jewel case

2.3 When multiple binders are used, correlate data into related consistent groupings.

2.4 Cover: Identify each Manual with type or printed title "Contract Record Documents"; list title of Contract, identify subject matter of contents.

2.5 Arrange content by systems or process flow, under Section numbers and sequence of Table of Contents.

2.6 Provide tabbed fly leaf for each separate Product and system, with typed description of Product and major component parts of equipment.

2.7 Text: Manufacturer's printed data, or typewritten data on 20 pound paper.

2.8 Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

PART 3 - CONTENTS

3.1 Operation and maintenance manuals shall contain the following minimum information and data:

.1 Table of contents: Provide title of Contract; names, addresses, and telephone numbers of Consultants and Contractor with name of responsible parties; schedule of Products and systems, indexed to content of the volume.

.2 For each Product or system: List names, addresses and telephone numbers of Subcontractors, suppliers and service representatives, including local source of replacement supplies and parts including telephone numbers.

.3 Warranties: Warranties are between the Contractor and Owner. Warranties shall include, as a minimum:

.1 Description of warranty coverage.

.2 Date warranty starts.

.3 Date warranty expires.

.4 Contact name, address and phone number (the Contractor shall also be responsible for advising the Owner of changes in contact information during the warranty period).

.5 Equipment and components performance curves.

.6 Hydro certificates.

.4 Reports: For each Product or system provide the following:

.1 Manufacturer's certified reports

.2 Factory test reports.

.3 Field testing reports.

.5 Details of design, construction and/or fabrication features, component function and maintenance requirements, to permit effective start-up, operation, maintenance, repair, modification, extension and expansion of any portion or feature of the installation.

.6 Technical data, Product data, supplemented by bulletins, component illustrations, detailed views, technical descriptions of items and parts lists.

.7 Schematics, interconnection lists: Manuals shall be complete with schematic and wiring diagrams, wiring interconnection lists and diagrams fully cross referenced and coordinated, printed circuit board layouts including the component identification, component parts list with electronic substitution equivalent. Provide cross referenced components lists and sequence of operations.

.8 Trouble shooting and fault location guide: Instructions to facilitate quick return of malfunctioning equipment to operation.

.9 Routine servicing and preventative maintenance schedule for Products and/or estimated hours required for routine servicing and preventative maintenance tasks.

.10 List of recommended spare parts and recommended quantity of each item to be stocked based on spare part availability and re-order time.

.11 Complete set of all reviewed shop drawings.

.12 Product data: Mark each sheet to clearly identify specific Products and component parts, and data applicable to installation; delete inapplicable information.

.13 Drawings: Supplement Product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams and as required in the Specifications.

.14 Typed text: As required to supplement Product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions and as required in the Specification.

PART 4 - DRAWINGS

4.1 Prepare all required drawings on CAD, using Autocad Version 2006 or higher.

4.2 Prepare CAD drawings to meet the requirements of the Owners or Consultant's CAD Standards and Procedures.

4.3 Supply and hand over to the Consultant, one full sized, original whiteprint, for each final drawing prepared under this Contract. These drawings are to incorporate all addenda and changes made during the construction period.

4.4 Prior to Contract Completion, supply and hand over to the Consultant, one complete set of CAD Drawing Files in Autocad format on storage media acceptable to Consultant for each final drawing prepared under this Contract, including but not limited to circuit drawings, equipment layout drawings, and shop drawings.

4.5 Refer also to specific requirements for Divisions 20 & 26.

4.6 The Consultant shall provide to the Contractor for a fee, a CD containing graphic (electronic) representation of the drawings. Complete and return the "Standard License Agreement" in order to receive and use the electronic files. (To be provided by Consultant upon request).

END OF SECTION

PART 1- GENERAL

Work Included in Section

.1 Various demolition and removals of existing and for provision of new work, as shown on architectural drawings.

.2 Restoration of damaged or disturbed Work.

.3 Removal of surplus materials from the site.

1.2 Related Sections

.1 Demolition requirements for existing and new work - Divisions 2 through 32.

1.3 Qualifications

.1 Work of this Section shall be executed by a company having a minimum of five (5) years continuous experience and able to deploy adequate equipment and skilled personnel to complete Work expediently in an efficient and orderly manner.

1.4 Examination

.1 Examine existing property. Determine nature and extent of materials to be removed.

.2 Examine adjacent properties. Determine extent of protection required.

1.5 Salvage

.1 Unless otherwise noted, materials from demolition shall become property of Contractor who shall promptly remove all salvageable material and debris from Site.

.2 Do not sell material on Site.

.3 The Owner will review Site prior to commencement of demolition and instruct the Contractor, in writing, as to the items to be retained for re-use or be turned over to the Owner.

.4 Store material to be salvaged, neatly on wooden pallets, where directed by Owner.

.5 Remove and store indicated items for future use by Owner. Remove, handle andtransport such items to storage area designated on Drawings or to an area within the site designated by Owner. Perform such work carefully and with diligence to prevent any damage to the items during removal and in storage.

1.6 Maintaining Traffic Hauling Operations

.1 Maintain and preserve Owner's access requirements within, to and from existing building in areas where demolition and removal work is being carried out.

.2 Do not close, obstruct, place or store material in Owner's driveways and passageways. Conduct operations with minimum interference with roads, streets, driveways, user traffic and passageways.

1.7 Hauling Operations

.1 Maintain roadways and paving in the hauling areas clean on a daily basis and as required by Municipal authorities.

1.8 Safety Requirements

.1 Undertake Work and effect arrangements required by authorities having jurisdiction for protection of public.

.2 Coordinate posting of danger signs conspicuously around property. Close doorways and thoroughfares giving access to area of demolition with barricades.

.3 Provide a competent, experienced supervisor in charge of the Work and on Site while Work is in progress.

.4 Demolition of spray or trowel-applied asbestos can be hazardous to health. Stop work and notify the Construction Manager immediately should material resembling spray or trowel-applied asbestos be encountered in the course of demolition work, which has not already been identified. Do not proceed until written instructions have been received from the Owner.

.5 Should any suspect designated substance not already identified, be encountered, cease work in the immediate area and immediately report, to the Owner. Owner is responsible for removal of designated substances.

1.9 Life and Fire Safety

.1 Provide fire extinguishers in acceptable locations to fire prevention authorities and of type suitable to enable personnel to cope with fire occurring during progress of Work.

1.10 Demolition Drawings

.1 Submit for approval; drawings, diagrams or details showing sequence of disassembly work and supporting structures.

.2 Submissions, if required, are to bear stamp of qualified professional engineer registered in Province of Ontario.

1.11 Protection

.1 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, parts of existing building to remain. Make good damage caused by demolition.

.2 Take precautions to support affected structures and, if safety of building being demolished or adjacent structures or services appears to be endangered, cease operations and notify Owner.

.3 Provide temporary weather enclosures to requirements of Division 1.

.4 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.

.5 Provide and maintain necessary fire extinguishers throughout the work to the approval of the Fire Marshal, and located at convenient and accessible points.

.6 Protect work to remain against damage of any kind.

.7 Protect building floors and roofing against damage from operations under this Section, including lifting, moving, rolling, etc., of materials. Use 12.7 mm (1/2”) thick plywood covers with ends mechanically joined, over floor for any such handling. Over roof, provide 19 mm (3/4”) thick plywood under laid with 1” thick polystyrene insulation board adhered to same. Provide same when working from, or over roof surfaces. Be responsible for repairs to flooring or roofing for any damage caused. Execute such repairs to the satisfaction of, and at no cost to Owner.

PART 2 - PRODUCTS

Not applicable

PART 3 – EXECUTION

3.1 INSPECTION

.1 Visit and examine the site and note all characteristics and features affecting the Work of this Section.

.2 Ensure all services, whether buried; built-in or exposed are properly identified as to position, type of service, size, direction of flow.

.3 Inspect materials, equipment, components to be re-used or turned over to the Owner. Note their condition and advise the Consultant in writing of any defects or conditions which would affect their removal and re-use.

3.2 PREPARATION

.1 Prevent movement, settlement or damage of elements of the existing building which are to remain. Provide bracing, shoring and supports as required. Protect existing surfaces not to be restored from damage during concrete removal procedures.

.2 Cut and/or cap existing services within the work area, if any, prior to start of Work as required, but do not affect the services of areas not under construction or essential to the ongoing operation of the building.

.3 In all cases, exercise all reasonable care during removal operations to avoid damaging items to be salvaged, re-used, or items that are not part of the Scope of Work.

.4 Seal off all work areas to prevent dust and debris from affecting other areas outside of work area. Prevent public access to areas being repaired.

.5 Tape and/ or seal and provide protection to all mechanical and electrical services and all fire alarm and security devices still functioning adjacent to the work areas to prevent damage resulting from dust, water, or impact.

.6 Cover floor drains as required to prevent concrete, abrasive blasting debris or any other material from entering the drains. Ensure that all drains continue to operate as required during construction.

.7 Remove or protect in place all surface mounted or permanent fixtures not to be demolished from damage during demolition procedure.

.8 Apply filter cloth to all exhaust and ventilation vents within work area to prevent dust generated by the construction activity from escaping.

.1 Contractor shall clean, or replace filter cloth if the filter cloth becomes unsuitably dirty as determined by Consultant.

3.3 DEMOLITION

.1 Execute Work in accordance with requirements of authorities having jurisdiction.

.2 At end of each day's work, leave Site in a safe condition and erect safety barriers and lights as required. Ensure that no parts of existing structure are in danger of collapsing.

.3 Perform demolition work where not specifically indicated, but required to make provisions for new Work.

.4 Provide any additional materials, labour and services required, not specifically mentioned or shown on Drawings, but necessary for proper completion of Work.

.5 Dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction.

.6 Leave work in safe condition so that no part is in danger of toppling or falling. Protect interiors of areas not to be demolished from exterior elements.

.7 Demolition of concrete shall be performed by percussive techniques to prevent damage to the embedded reinforcing to remain and the supporting structural steel framing below.

.8 If required, provide shoring to support the slab when removals reduce its load-carrying capacity, as directed by the Consultant. No payment will be made for such shoring as it is to be included in the cost of repair as outlined in these documents.

.9 Materials forming permanent part of the building that require removal become contractor's property and must be removed from site daily, unless such materials are otherwise specified or shown on Drawings to be reused under this Contract (or turned over to Owner). Remove materials not suitable for reuse as shown on Drawings (as specified) from site.

.10 Leave building in a "broom-clean" condition on completion of work to Owner's satisfaction.

.11 Clean existing surfaces specified to receive new applied finishes to assure proper adherence.

.12 Clean existing surfaces to receive paint finish to paint manufacturer's written specifications and/or recommendations.

.13 Confine operations and workers to those parts of the building which are defined on Drawings, and exercise great care not to damage existing construction beyond that necessary for the carrying out new work and make good any such damage in every respect.

.14 Do not disturb adjacent items designated to remain in place.

.15 All required re-painting due to damage, overspray, etc. is the Contractor’s responsibility.

3.4 WASTE DISPOSAL

.1 Disposal of waste products and material is to be in strict accordance with the product manufacturer’s material safety data sheets and in accordance with the governing waste control regulations.

.2 The existing drainage system is not to be used to dispose of project wastes and / or materials

.3 Store volatile wastes or material in covered metal containers. All wastes which create hazardous conditions must be removed from the premises daily.

END OF SECTION

PART 1 - GENERAL

1.1 General Instructions

.1 Read and be governed by Conditions of the Contract and Sections of Division 1.

1.2 Section Includes:

.1 Design, labour, Products, equipment and services necessary for r furnishing and installing metal fabrications made from steel shapes, plates, bars, strips, tubes, pipes and castings not a part of structural steel or specified in other Sections, including but not limited to the following items:

1. Tubular framing for sliding folding door.
2. Miscellaneous steel framing for partition supports.
3. Guardrails, railings and handrails.
4. Miscellaneous angles, plates, bars, rods and other items not specified in other Sections but shown or required to complete the work.

.5 Screened mechanical equipment enclosure complete with access gate.

1.3 Quality Assurance

.1 Execute Work of this Section only by a Subcontractor who has adequate plant, equipment, and skilled workers to perform Work 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.

1.4 Reference

.1 ASTM A123, Specification for Zinc (Hot Dip Galvanized) Coatings on Iron & Steel Products.

.2 ASTM A153, Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

.3 ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.

.4 ASTM A653/A653M, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc- Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.

.5 ASTM D7803, Specification for Preparation of Zinc (hot dip galvanized) coated iron and steel products and surfaces for powder coating.

.5 CAN/CSA-G40.20/G40.21-M, General Requirements for Rolled or Welded Structural Quality Steel/ Structural Quality Steels.

.6 CAN/CSA G164-M, Hot Dip Galvanizing of Irregularly Shaped Articles.

.7 CAN/CSA S16.1-M, Limit States Design of Steel Structures.

.8 CSA S136.1-M, Commentary on CAN/CSA S136-M, Cold Formed Steel Structural Members.

.9 CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.

.10 CSA W48, Filler Metal and Allied Materials for Metal Arc Welding.

.11 CSA W59-M, Welded Steel Construction (Metal Arc Welding).

.12 CAN/CSA W117.2-M, Safety in Welding, Cutting and Allied Processes.

.13 CAN/CGSB 1.40-M, Primer, Structural Steel, Oil Alkyd Type.

.14 CGSB 1-GP-181, Organic Zinc Rich Primer.

.15 CGSB 85-GP-16M, Painting Galvanized Steel.

.16 ASTM B209M, Specification for Aluminum and Aluminum-Alloy Sheet and Plate

.17 Steel Structures Painting Council (SSPC), Steel Structures Painting Manual, Vol. 2.

.18 National Association of Metal Manufacturers (NAAMM) Metal Finishes Manual, 2006

.19 AAMA 621 - Voluntary Specification for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) and Zinc-Aluminum Coated Steel Substrates

1.5 Design Criteria

.1 Work of this Section which functions to resist forces imposed by dead and liveloads shall conform to requirements of jurisdictional authorities.

.2 Design work of this Section and applicable shop drawings shall be carried out by a qualified professional engineer licensed to practice in the Place of Work.

.3 Design details and connections, where not shown on Drawings, in accordance with CAN/CSA-S16.1 and CSA S136.1.

1.6 Submittals

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

.2 Clearly indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

.3 Shop drawings shall be sealed by a qualified professional engineer licensed to designs structures and registered in Place of the Work.

.4 Provide physical samples demonstrating finishes of all exposed metal fabrications.

1.7 Delivery, Storage and Handling

.1 Label, tag or otherwise mark Work supplied for installation by other Sections to indicate its function, location in building and shop drawing designation.

.2 Protect Work from damage during delivery, storage and handling

PART 2 - PRODUCTS

2.1 MATERIALS

.1 General:

.1 Unless detailed or specified otherwise, standard products will be acceptable if construction details and installation meet intent of Drawings and Specifications.

.2 Include materials, products, accessories, and supplementary parts necessary to complete assembly and installation of Work of this Section.

.3 Incorporate only metals that are free from defects which impair strength or durability, or which are visible. Install only new metals of best quality, and free from rust or waves and buckles, and that are clean, straight, and with sharply defined profiles.

.2 Structural shapes, plates, and similar items: CAN/CSA-G40.20/G40.21-M, Grade 350W. Hollow structural sections: CAN/CSA-G40.20/G40.21-M, Grade 350W, Class H.

.3 Welding materials: CSA W48 and CSA W59-M.

.4 Fasteners: Conforming to ASTM A307, Grade A, in areas not exposed to view, use unfinished bolts with hexagon heads and nuts. In areas exposed to view, use concealed fasteners or as indicated on drawings/details.

.1 Stainless steel fasteners to be used at all stainless steel fabrications

.5 Primer paint: CAN/CGSB-1.40-M or CPMA 1.73a.

.6 Drilled inserts: Mega by ITW Construction Products or HSL by Hilti Inc. heavy-duty anchors, sizes as shown, or as per Structural.

.7 Aluminum:

.1 Extrusions: ASTM B221, alloy 6063-T6.

.2 Sheet: ASTM B209, alloy 5005-H15.

.3 Bars, Rods and Wires: ASTM B211.

.4 Drawn Seamless Tubing: ASTM B210.

.5 Castings: ASTM B26 or B108, alloy 214 unless otherwise recommended by aluminum producer or finisher.

.8 Grout:

.1 Non-Shrink Non-Metallic Grout: Euclid Chemical Co. "Euco N-S Grout", L&M Construction Chemicals, Inc. "Crystex", Master Builders Technologies, Inc. "Masterflow 928 and 713" or equivalent as per Specification 01 25 00.

2.2 FABRICATION

.1 Verify dimensions of existing Work before commencing fabrications and report any discrepancies to the Consultant.

.2 Fit and assemble Work in shop where possible. Execute Work in accordance with details and reviewed shop drawings.

.3 Use self-tapping shake-proof screws on items requiring assembly by screws or as indicated. Use screws for interior metal work. Use welded connections for exterior metal Work unless otherwise found acceptable by the Consultant.

.4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush. Seal exterior steel fabrications against corrosion in accordance with CAN/CSA S16.1-M.

.5 Execute shop welding to requirements specified.

.6 Carefully make and fit details. Take special care with exposed finished Work to produce a neat and correct appearance to the Consultant's acceptance.

.7 Assemble members without twists or open joints.

.8 Correctly size holes for connecting Work of other trades where such can be determined prior to fabrication. Where possible, show holes on shop drawings. Place holes not to cause appreciable reduction in strength of member.

.9 Draw mechanical joints to hairline tightness and seal countersunk screw and access holes for locking screws with metal filler where these occur on exposed surfaces.

.10 Galvanizing: Provide zinc coating for all exterior items and as indicated or specified to be galvanized, as follows:

1. ASTM A153 for galvanizing iron and steel hardware.
2. ASTM A123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299-inch thick and heavier.

2.3 FABRICATED ITEMS

.1 Refer to Drawings for details of metal fabrication work and related items not specifically listed in this Section.

.1 Miscellaneous steel brackets, supports, angles and fabrications

.1 Supply and install or supply for installation by trades responsible, all loose steel brackets, supports and angles where indicated, except where such brackets, supports and angles are specified under work of other Sections. Drill for countersunk screws, expansion anchors and anchor bolts.

.2 Unless otherwise specified, prime paint for interior installation; and galvanized for exterior installation.

.2 Support posts concealed within partial height partitions.

.3 Handrails and guardrails.

.2 Where work is required to be built into work of other Sections supply such members to respective Sections.

2.4 ANCHORS AND FASTENING

.1 Use weld studs of size not larger than 10 mm for attaching miscellaneous materials and equipment to building steel. If weight of item requires larger fasteners use clips or brackets and secure by welding or through bolting.

.2 Use self drilling expansion type concrete anchors for attaching to masonry and concrete

.3 Use steel beam clamps of two bolt design to transmit load to beam web. Do not use C and I clamps.

2.5 WELDING

.1 Perform welding by electric arc process.

.2 Execute welding to avoid damage or distortion to Work. Execute welding in accordance with following standards:

.1 CSA W48 - for Electrodes. If rods are used, only coated rods are allowed.

.2 CSA W59-M and CSA W59S1-M for design of connections and workmanship.

.3 CAN/CSA W117.2-M - for safety.

.3 Thoroughly clean welded joints and expose steel for a sufficient distance to perform welding operations. Finish welds smooth. Supply continuous and ground welds which will be exposed to view and finish paint.

.4 Test welds for conformance and remove Work not meeting specified standards and replace to Consultant's acceptance.

2.6 SHOP PAINTING

.1 Clean steel to SSPC SP6 and remove loose mill scale, weld flux and splatter.

.2 Shop prime steel with one coat of primer paint to dry film thickness of 0.07 mm. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 deg C. Paint items under cover and leave under cover until primer is dry. Follow paint manufacturer's recommendations regarding application methods, equipment, temperature, and humidity conditions.

.3 Shop prime galvanized steel in accordance with CGSB 85-GP-16M.

.4 Clean but do not paint surfaces being welded in field.

.5 Do not paint surfaces embedded in concrete, but clean as if they were to be primed.

.6 Do not prime machine finished surfaces, but apply an effective anti-rust compound.

.7 Take precautions to avoid damage to adjacent surfaces.

PART 3 - EXECUTION

3.1 Examination

.1 Take site measurements to ensure that Work is fabricated to fit surrounding construction, around obstructions and projections in place, or as shown on Drawings, and to suit service locations.

3.2 Installation

.1 Install Work plumb, true, square, straight, level, and accurately and tightly fitted together and to surrounding Work and as required for proper performance.

.2 Include with Work of this Section anchor bolts, high tensile bolts, washers and nuts, expansion bolts, toggles, straps, sleeves, brackets, clips, and other items necessary for secure installation as required by loading and jurisdictional authorities. Weld to CAN/CSA-S16.1-94.

.3 Countersink holes provided for wood screws where wood is attached to Work of this Section.

.4 Attach Work to interior concrete and masonry with corrosion resistant expansion bolts to support load with a safety factor of three (3).

.5 Attach Work to exterior concrete and masonry with non-shrink epoxy grout to support load with a safety factor of three (3).

.6 Insulate between dissimilar metals or between metal, and masonry or concrete with bituminous paint to prevent electrolytic action.

.7 Grout metal posts, pickets, balusters, and the like, in metal sleeves cast into concrete, with non-shrink quick setting epoxy anchor cement, unless detailed otherwise. Fabricate sleeves of 75 mm (3") minimum depth.

.8 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.

3.3 Field Painting

.1 Paint bolt heads, washers, nuts, field welds and previously unpainted items. Touch up shop primer damaged during transit and installation, with primer to match shop primer.

3.4 Adjustment and Cleaning

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

3.5 Protection

.1 Protect shop finished items during installation.

.2 Maintain protection of Work of this Section from time of installation until final finishes are applied or to final cleanup.

END OF SECTION

PART 1 - GENERAL

1.1 Definition

.1 Architectural woodwork: Shall mean custom fabricated cabinetry and counters/countertops and sloped exterior soffit canopy.

1.2 Quality Assurance

.1 The "Quality Standards" of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), Edition 3, 2017 together with authorized additions and amendments, shall be used as a reference standard and shall form part of this Project Specification.

.2 Where modifications to the AWMAC Quality Standards contained within the Manual are included in this Project Specification, then such modifications shall govern in case of conflict.

.3 Any reference in Custom or Premium grade in this Specification shall be as defined in the AWMAC Quality Standards.

.4 Any 'item not given a specific quality grade shall be Premium grade as defined in the AWMAC Quality Standards.

.5 All architectural woodwork to be used in the Project shall meet the requirements of the AWMAC Quality Standards for the particular grade specified.

.6 References in this Specification to part and item numbers mean those parts and items contained within the AWMAC Quality Standards Manual.

.7 Woodwork Manufacturer Qualifications:

.1 Member in Good Standing of AWMAC.

.2 Minimum 5 years of production experience similar to this project, whose qualifications indicate ability to comply with requirements of this Section.

1.3 Submittals

.1 Shop Drawings:

.1 Prepare and submit to the Consultant for review Shop Drawings for architectural woodwork in accordance with 01 33 00.

.2 Shop Drawings shall show wood and metal construction details of all architectural details of all general arrangements, locations of all service outlets: typical and special installation conditions; materials being supplied and all connections, attachments, anchorage and location of exposed fastenings, as applicable, field measured dimensions and coordination with other trade Contractors.

.3 Shop Drawings shall incorporate plans, elevations, sections and details for all architectural woodwork included in this Section.

.4 No Work shall be fabricated until the Shop Drawings have been reviewed and all other related submittals, and samples as required by the Specifications, have been approved by the Consultant.

.5 Submission of Consultant’s Drawings for Shop Drawings is not acceptable.

.2 Samples:

.1 Provide 3 samples of each plastic laminate, wood veneer, solid hardwood and solid polymer surface to Consultant for review.

.3 Brochures:

.1 Submit manufacturer's descriptive literature of specialty items not manufactured by the architectural woodwork manufacturer as required by the Consultant.

1.4 Product Handling and Storage

.1 The architectural woodwork manufacturer and the Contractor shall be jointly responsible to make certain that architectural woodwork are not delivered until the building and storage areas are sufficiently dry so that the architectural woodwork will not be damaged by excessive changes in moisture content.

.2 Architectural woodwork delivery, storage, and handling shall be in accordance with AWMAC Quality Standards.

.3 Delivered, materials which are damaged in any way or do not comply with these Specifications will be rejected by the Consultant and shall be removed from the job site and replaced with acceptable materials.

1.5 Pre-Installation Meeting

.1 Before framing is completed hold a meeting with the contractor, paneling manufacturer, paneling installer, and framing sub-contractor.

.1 Review locations of backing required for paneling installation as shown on paneling shop drawings.

.2 Review method of attachment for backing to wall system.

1.6 Warranty

.1 Warrant labour, materials and Workmanship against defects and deficiencies for a period of two (2) years after the date of Substantial Performance.

PART 2-PRODUCTS

2.1 Components

.1 **Plastic Laminate (Plam)**: 1.6 mm thick, (allow for 3 colours)

.1 Manufacturer: Abet Laminati, Wilsonart, Nevamar, Pionite or Formica

.2 Colour: to be selected by Consultant from full colour range

.2 **Solid Polymer Fabrication (QTZ)**: Solid, mineral based, non porous surfacing material, acrylic; not coated, laminated or of composite construction; in accordance with ANSI Z124 Type 6 and meeting the following:

.1 Properties:

.1 Tensile strength (ASTM D638-84): 6000psi.

.2 Tensile modulus (ASTM D638-84): 1.5 x 10 psi.

.3 Elongation (ASTM D638-84): 0.4%

.4 Hardness (Rockwell “M” Scale): 94.

.5 Hardness (Barcol Impressor): 60.

.6 Gloss – 60 deg. Gardner 9ANSI Z124-80, HUD Bulletin UM-73-84): 5 – 20.

.7 Colour stability (NEMA LD3): no change 200 hours.

.8 Wear, cleanability (ANSI Z124-80, HUD Bulletin UM-73-84): pass.

.9 Fire hazard (ASTM E84):

.1 Flame spread: maximum 15.

.2 Smoke developed: maximum 25.

.10 Water absorption (ASTM D570-81): 0.04% @ 24 hours/0.4% @ long term for 19 mm thickness sample.

.11 Stain resistance (ANSI Z124).

.2 Acceptable Manufacturers:

.1 Quartz by Corian or equivalent.

.3 Colour: Allow for 1 colour to be selected by Consultant from price group 4.

.3 Plywood: veneer core, softwood, 19 mm thick typical unless otherwise indicated.

.1 Softwood: to CSA 0151.

.2 Fir to CSA0121-M1978.

.3 Hardwood plywood: to CSA O115.

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

.5 Where plywood is used for wall construction, the Flame Spread rating must be 150 or less on any exposed surface, or any surface that would be exposed by cutting through the material in any direction.

.6 Where plywood is used in ceiling construction, the Flame Spread rating must be 25 or less on any exposed surface, or any surface that would be exposed by cutting through the material in any direction.

.4 Sealant: As per 07 92 00.

2.2 Millwork Hardware

.1 As per Drawings/details.

2.3 Millwork Finishing - General

.1 Finish all interior millwork surfaces in plastic laminate, unless otherwise indicated.

2.4 Fabrication - General

.1 Obtain all on-Site dimensions before fabricating items. Obtain all relevant data and incorporate provisions for items of equipment enclosed by millwork.

.2 Verify wall alignment prior to proceeding with fabrication. Site conditions at variance with reviewed Shop Drawings shall be specifically noted on reviewed Drawings and forwarded to Consultant. Variances, due to Site conditions necessitating revisions to Shop Drawings shall be accepted prior to fabrication.

.3 Fabricate running members in maximum standard lengths obtainable for the particular species wherever possible.

.4 Fit all joints tight. Locate joints at points which will not interfere with, affect strength or detract from appearance of materials.

.5 Securely fasten intersecting framing members together at corners in an approved manner. Reinforce as required for rigid assembly designed for applicable loads.

.6 Wherever practicable, install, fit and adjust all hardware specified, in shop.

.7 Incorporate adequate provisions for scribing and fitting to adjoining surfaces in a manner acceptable to Consultant.

.8 Provide for and incorporate provisions to recognize inherent shrinkage characteristics of materials specified.

.9 Casework core material: 19 mm veneer core plywood.

.10 Casework edge trim: Plastic laminate with plastic laminate millwork and solid wood lippings with wood veneer millwork.

.11 Plastic laminate finish at all exposed surfaces, including cabinet/drawer interiors unless noted otherwise.

2.5 Accessories

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

.2 Wood screws: to CSA B35.4 stainless steel, type and size to suit application.

.3 Splines: wood.

.4 Adhesive: recommended by manufacturer.

.5 Use least toxic sealants, adhesives, sealers, and finishes necessary to comply with requirements of this section.

PART 3 - EXECUTION

3.1 Job Conditions

.1 Job conditions for installation of architectural woodwork shall be as specified under AWMAC Quality Standards.

3.2 Installation

.1 Cabinet and Casework: Install in accordance with Section 10.4 of the AWMAC Quality Standards.

.3 Finish Hardware: Install finish hardware in accordance with Section 10.3 of the AWMAC Quality Standards.

.4 All cutting and fitting of trim around fixtures and receptacles to be done as no extra cost to Contract.

.5 Scribe countertops to wall during installation. Install silicone sealant at backsplash/wall junction at time of installation. Colour to Consultant’s selection.

3.3 Adjusting & Touch Up

.1 Adjust all moving and operating parts to function smoothly and correctly.

.2 Fill and retouch all nicks, chips and scratches. Replace all un-repairable damaged items

3.4 Cleanup

.1 Upon completion of installation, clean installed items of pencil and ink marks, and broom clean area of operation.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Labour, Products, equipment and services necessary for the thermal insulation Work in accordance with the Contract Documents.

1.2 REFERENCES

.1 CAN/ULC S102-[2011],Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

.2 CAN/ULC S114-[2005], Standard Method of Test for Determination of Non-Combustibility in Building Materials.

.3 CAN/ULC-S702, Mineral Fibre Thermal Insulation for Buildings.

.4 ASTM C165 - [2012], Standard Test Method for Measuring Compressive Properties of Thermal Insulations.

.5 ASTM C303 - [2010], Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation.

.6 ASTM C423 - [2009a], Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.

.7 ASTM C518 - [2015], Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

.8 ASTM C612 - [2014], Standard Specification for Mineral Fiber Block and Board Thermal Insulation.

.9 ASTM C665 - [2012], Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

.10 ASTM C795 - [2013], Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.

.11 ASTM C1104/C1104M - [2013], Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.

.12 ASTM C1338 - [2014], Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.

.13 ASTM E96/E96M - [2016], Standard Test Methods for Water Vapor Transmission of Materials.

1.3 SUBMITTALS

.1 Product data: Submit manufacturer's Product data in accordance with Section 01 33 00 indicating characteristics, performance criteria, and limitations. Indicate installation requirements and techniques, storage, and handling criteria and installation procedure acceptable to manufacturer.

1.4 QUALITY ASSURANCE

.1 Qualifications: Execute Work of this Section by company specializing in thermal insulation Work with minimum of three years, recent, documented experience, on Work of comparable complexity and scope.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Thermal Batt Insulation (within wall framing cavity):

.1 Mineral Wool Batt Insulation: Conforming to CAN/ULC-S702, Type 1, unfaced, friction-fit batt insulation for wood and metal stud installation, thickness or thermal resistance as indicated on drawings. Accepted products:

.1 “Rock Wool Batt Insulation” as manufactured by Fibrex Insulations Inc.

.2 “Flexibatt Rock Wool Insulation” as manufactured by Roxul Inc.

.2 Rigid insulation: CAN/ULC-S701, Type 4; Extruded polystyrene, ship-lapped edges. Thickness or thermal resistance: As indicated on Drawings. Accepted products:

.1 Styrofoam Panelmate Ultra by Dow Chemical Canada Inc.

.2 Celfort 300 by Owens Corning Canada Inc.

.3 Semi-rigid insulation (within rainscreen cavity):

.1 Semi-rigid mineral wool conforming to CAN/ULC-S114: non-combustible; CAN/ULC S102: 0 Flame Spread Index and 0 smoke development index; minimum density: 100 kg/m3 outer layer/ 61 kg/m3 inner layer, R-value/inch @ 75 F: 4.2 hr.ft2/Btu; thickness as scheduled.

.1 ‘CavityRock’ by Rockwool.

.2 JM Cladstone by Johns Manville.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for insulation installation in accordance with manufacturer’s written recommendations.

.1 Visually inspect substrate in presence of Consultant.

.2 Ensure surfaces are free of snow, ice, frost, grease and other deleterious materials.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

.2 Start of insulation installation indicates installer’s acceptance of substrate installation conditions.

3.2 INSTALLATION

.1 Install insulation in accordance with manufacturer’s written recommendations.

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

.3 Keep insulation minimum [75] mm from heat emitting devices such as recessed light fixtures, and minimum [50] mm from sidewalls of chimneys and vents.

.4 Refer to insulation manufacturer’s current installation guide for detailed information regarding installation.

.5 Below slab on grade installation

.1 Place insulation boards snugly around perimeter of slab on-grade and laid directly over well compacted porous fill.

.2 Loose lay insulation with edges butted tightly together.

.3 Cut and trim insulation neatly to fit spaces. Use longest possible lengths to reduce number of joints.

.6 Cavity Wall installation:

.1 Neatly fit semi-rigid insulation between masonry ties/subgirts. Mechanically fasten with thermally broken fasteners where required (Ramset I-F or equivalent).

3.3 ADJUSTING & CLEANING

.1 At completion of installation remove off site all excess material and debris. Leave in clean, neat condition.

.2 Make good all defects to this installation or defects to other Work caused by this installation.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY OF WORK

.1 This Section includes surface preparation and application of air/weather resistive barriers and accessories. Drawings and details outline the design intent of a continuous membrane barrier to achieve a highly air tight envelope.

1.02 REFERENCE STANDARDS

.1 Air Barrier Association of America (ABAA)

1. ABAA [2011], Installer's Certification Program.
2. ABAA [2012], Water-resistive Barrier Installation Guideline.

.2 American Association of Textile Chemists and Colorists (AATCC)

1. AATCC 127 [2008], Water Resistance: Hydrostatic Penetration Test.

.3 American Architectural Manufacturer's Association (AAMA)

.1 AAMA 711-[2007], Voluntary Specification for Self Adhering Flashing Used for Installation of Exterior Wall Fenestration Products.

.4 ASTM International (ASTM).

1. ASTM D1204-[2008], Standard Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature.
2. ASTM D3330-[2010], Standard Test Method for Peel Adhesion of Pressure-Sensitive Tape.
3. ASTM D5034-09, Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)
4. ASTM E84-[2010b], Standard Test Method for Surface Burning Characteristics of Building Materials.
5. ASTM E96/96M-[2010], Standard Test Methods for Water Vapor Transmission of Materials.
6. ASTM E154-[2008a], Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
7. ASTM D146-97 - Standard Test Methods for Sampling and Testing Bitumen-Saturated Felts and Fabrics Used in Roofing and Waterproofing.
8. ASTM D412-98a (2002) e1 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
9. ASTM E96-00e1 (Method B) - Standard Test Methods for Water Vapor Transmission of Materials.
10. ASTM E283-91 (1999) - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
11. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.
12. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference.
13. ASTM E2178-01 - Standard Test Method for Air Permeance of Building Materials.
14. ASTM E2357 - 05 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

.5 CAN/ULC

1. CAN/ULC-S742-11, Standard for Air Barrier Assemblies.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

.1 Make submittals in accordance with Contract Conditions and Section 01 33 00 - Submittal Procedures.

.2 Product Data: Submit product data including manufacturer's literature for air/water-resistive barrier membrane and accessories, indicating compliance with specified requirements and material characteristics.

1. Submit list on manufacturer's letterhead of materials, components and accessories to be incorporated into Work.
2. MSDS report.
3. Include product names, types and series numbers.
4. Include contact information for manufacturer and their representative for this Project.

.3 Samples:

1. Submit duplicate 12 x 12 inches sample of membrane.
2. Submit duplicate 12 inches long samples of seam tape and each type of flashing materials.

.4 Test Reports:

1. Submit test reports showing compliance with specified performance characteristics and physical properties including air permeance, water vapour permeance and structural performance.
2. ICC-ESR documentation demonstrating compliance with ICC-AC 38 Acceptance Criteria for Water-Resistive Barriers.

.5 Field Reports: Submit manufacturer's field reports within 3 days of each manufacturer representative's site visit and inspection.

.6 Installer Qualifications:

1. Submit verification of manufacturer's approval of installer with work similar to work of this Section and verification of ABAA certification.

1.04 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data: Supply maintenance data for air/vapour and moisture-resistive barrier materials for incorporation into manual specified in Section 01 78 00 Closeout Submittals.

1.05 DELIVERY STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements:

.1. Deliver materials and components in manufacture's original packaging with identification labels intact and in sizes to suit project.

.2 Storage and Handling Requirements: Store materials off ground and protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

1.06 WARRANTY

.1 Project Warranty: Refer to Contract Conditions for project warranty provisions.

.2 Manufacturer's warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to and not intended to limit other rights Owner may have under Contract Conditions.

1. 10 years limited material warranty.

.3 Warranty period: [1] years commencing on Date of Substantial Performance of Work.

PART 2 - PRODUCTS

2.01 DESCRIPTION

.1 Vapor permeable air and water-resistive barrier, highly tear-resistant membrane, with non-woven polypropylene (PP) fabric, UV stable acrylic coating, and highly aggressive adhesive coating on the back.

.1 Design criteria:

.1 Water Vapor Permeance: To ASTM E96-05 (Procedure B) 50 perms.

.2 Water Penetration: To AATCC 127 No leakage.

.3 Air Permeance: To ASTM E2178, <0.0034 cfm/sq ft @ 0.3 inches wg (< 0.02 l/(s x m²) @ 75 Pa).

.4 Tensile Strength: To ASTM D5034 MD 101 lb, CD 94 lb minimum.

.5 Elongation at Break: To ASTM D5034 MD 40 %, CD 58 % minimum.

.6 Bent Test: To ICC AC 38, 3.2.4, No cracking.

2.02 MATERIALS

.1 Air/Water-resistive Barrier for Walls: Self-adhesive vapor permeable air/water-resistive barrier; highly tear-resistant membrane, with non-woven polypropylene (PP) fabric with UV stable acrylic coating.

1. Weight: 44 lb/roll nominal.
2. Roll Dimensions: [4’11” (1.5 m) x 115’ (35 m)],
3. Color: Black.
4. Acceptable Material: Dörken Systems Inc., DELTA®-FASSADE SA or equivalent as per Specification 01 25 00

2.03 ACCESSORIES

.1 Tape: Acrylic-based adhesive tape in accordance with [air] [water-resistive] barrier manufacturer’s written recommendations.

1. Acceptable material: Dörken Systems Inc., DELTA®-FASSADE TAPE

.2 Flashings: Self-adhering, butyl-rubber based air/water-resistive flashing membrane in accordance with air water-resistive barrier manufacturer’s written recommendations

1. Acceptable material: Dörken Systems Inc., DELTA®-FASSADE FLASHING

.3 Penetration Flashings: Stretchable butyl-rubber based adhesive on non-woven fabric flashing membrane in accordance with air/water-resistive barrier manufacturer’s written recommendations.

1. Acceptable material: Dörken Systems Inc, DELTA®-FLEXX BAND.

.4 Sealants and Adhesives: Elastomeric sealant and adhesive in accordance with air/water-resistive barrier manufacturer’s written recommendations.

1. Ensure sealants are compatible with adjacent materials.
2. Acceptable material: Dörken Systems Inc., DETLA®-TILAXX.

.5 Primers: In accordance air/water-resistive barrier manufacturer’s written recommendations.

1. Acceptable materials: Dörken Systems Inc., DELTA®-HF PRIMER or DELTA®-ADHESIVE LVC or DELTA®-ADHESIVE (cold weather only).

.6 Flexible Membrane Through-wall Flashing: Self-adhering, butyl-rubber based flashing membrane.

1. Acceptable materials: Dörken Systems Inc., DELTA®-TW FLASHING.

PART 3 - EXECUTION

3.01 INSTALLERS

.1 Use only installers with 2 years minimum experience in work similar to work of this Section.

3.02 EXAMINATION

.1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for air/vapour and moisture resistive barrier installation in accordance with manufacturer's written recommendations.

1. Visually inspect substrate.
2. Inform Consultant of unacceptable conditions immediately upon discovery.
3. Proceed with installation only after unacceptable conditions have been remedied. Commencing work indicates acceptance of substrate condition.

3.03 PREPARATION

.1 Ensure step flashings and kick-out flashings are installed before beginning installation of membrane.

.2 Ensure protrusions that may penetrate air/water-resistive barrier membrane are removed before beginning installation.

.3 Patch all holes and voids and smooth out any surface misalignments.

.4 Patch all cracks, protrusions, small voids, offsets, details, irregularities, and small deformities with cementitious patching mortar.

.5 Ensure joints between dissimilar building materials are sealed with a strip of self-adhesive membrane 150 mm (6") wide centered over the joint.

.6 Protect adjacent surfaces from overspray/contact.

3.04 INSTALLATION

.1 Install air/water-resistive barrier before installation of windows and doors in accordance with manufacturer's written recommendations.

.2 Do installation in accordance with ABAA written recommendations for installation of air/water-resistive barriers.

.3 Unroll air/water-resistive barrier with smooth side out, wrapping entire building, including rough openings for windows, doors and other protrusions or penetrations.

1. If required, prime substrate before applying air/water-resistive barrier in accordance with manufacturer's written recommendations. Allow to dry 120 minutes or until tacky (depending on weather conditions) before applying air/water-resistive barrier.
2. Install air/water-resistive barrier plumb and level to exterior face of exterior gypsum board in accordance with manufacturer written recommendations.
3. Ensure air/water-resistive barrier is installed with printed side facing installer.
4. Remove release liner from back of membrane and press firmly onto substrate. Roll firmly in place with hand roller.

.4 Start installation of air/water-resistive barrier at building corner, leaving 6-12 inches of membrane extended beyond corner.

.5 Install horizontally starting at bottom of wall.

1. Overlap air/water-resistive barrier membrane as follows:

.1 Exterior Corners: [12] inches minimum.

.2 Vertical seams: [3-6] inches minimum.

.3 Horizontal seams: [2.5] inches minimum.

.4 Other seams, joints or at protrusions and penetrations: [3-6] inches minimum.

.6 Sill Plate Interface: Extend lower edge of air/water-resistive barrier over sill plate interface 3 - 6 inches.

1. Adhere to substrate by removing release liner in accordance with air/water-resistive barrier manufacturer's written recommendation.

.7 Ensure installed air/water-resistive barrier is not exposed to UV for longer than 30 weeks.

3.06 CLEANING

.1 Final Cleaning: Upon completion, remove surplus materials, rubbish, tools, and equipment.

3.07 PROTECTION

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

.2 Repair damage to adjacent materials caused by air/water-resistive barrier installation.

END OF SECTION

PART 1 – GENERAL

1.1 General Requirements

.1 This section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

1.2 Description of Work

.1 This sub trade is responsible for the supply and installation of the following items, including all related labour and materials necessary to successfully complete the installation of same whether or not in the Contract Documents:

.1 Fiber reinforced composite cladding panels

.2 Fastening system

.3 Closures and related trim

.4 Caulking and sealants

.5 Other related Work as indicated on Drawings, Details and Specifications

1.3 Submittals

1. Submit Shop Drawings of panel installation, material, panel layout, and accessories in accordance with Section 01 33 00. No Work shall be fabricated before Shop Drawings have been reviewed/ returned. **Submitting the Architect's Drawings for this purpose is not acceptable.**
2. Indicate on Shop Drawings all information required to fabricate and install the components of this system. This shall include dimensions, connection and jointing details, gauges, finishes, etc. Ensure that plan and section details of interior and exterior corners, horizontal and vertical joints, fascias and soffits, cut-outs, miscellaneous trim, fastening methods etc are shown at a minimum scale of 1:5.
3. Shop Drawings indicating connection and support of cladding panels shall be sealed by a qualified professional engineer licensed to design structures and registered in Ontario.
4. Submit 100mm x 150mm sample of proposed color for review.
5. Submit samples of accessories if requested by the architect.
6. Submit manufacturer's data sheets covering the care and recommended maintenance procedures of siding for incorporation into maintenance manuals.
7. Submit copies of manufacturer's warranties.

1.4 Quality Assurance

1. Installers shall have a minimum of ten (10) years of proven experience in the installation of similar products specified on projects of a similar size and scope.
2. Install a mockup on the building in a location as directed by the architect. Mockup shall incorporate panels, and all required finishing accessories and adjacent materials including flashing, windows, doors and trim. Mock up may form part of the work.

1.5 Delivery, Storage and Handling

1. Deliver, store and handle materials in accordance with the site and environmental conditions prescribed by the manufacturer.
2. Remove damaged materials from the site.

1.6 Coordination with Other Trades

1. All penetrations through the siding for the work of other trades shall be fitted with a watertight sleeve.

1.7 Warranty

1. Provide manufacturer's ten (10) year warranty from date of production to maintain the mechanical qualities, water tightness and frost resistance with exception of a gradual change caused by normal wear (aging), provided the panels are correctly installed on a ventilated construction according to the installation prescriptions of the producer.
2. The following will be deemed as defective Work; leakage, failure to stay in place, undue cracking, chipping or adjacent deformations, panel deformation, buckling, spalling, deterioration of surface. Failure of 15% of surface area of panels shall be deemed a total failure of the installation requiring complete re-application of panels.

PART 2 – PRODUCTS

2.1 Panel System

1. Material: Cement, calcium-silicate strengthened with cellulose fibers and resins without asbestos, fiberglass or formaldehyde.
2. Size:
   .1 As per Drawings.
3. Thickness:
   .1 Minimum 8mm thick, suitable for face fastening according to panel sizes indicated on Drawings
4. Panels shall be non-combustible when tested to ASTM E-136-81/CAN4-S114M80 and shall meet a maximum flame spread rating of 5 and a maximum smoke development rating of 25 when tested in accordance with CAN4-S102M
5. Surface: smooth
6. Colour: as selected by consultant from manufacturer standard colour range
7. Face fastened
8. Acceptable Manufacturers/Distributors:
   .1 Tectiva Fibre Cement Panel as manufactured by Equitone. Distributed by Engineered Assemblies.
   .2 Avera Fibre Cement Panel as manufactured by Swisspearl. Distributed by Muralis Architectural.
   .3 Equivalent products as per 01 25 00

2.2 Fasteners

.1 As recommended by panel manufacturer, to suit backup assembly as detailed.

.2 All fasteners to have sufficient corrosion resistance or be coated with corrosion resistant products and colour matched with cladding panel.

2.3 Thermally Broken Cladding Support Framing (Inner Layer/Horizontal)

.1 Thermally broken exterior wall panel sub-framing support/attachment system to meet ASHRAE 90.1 wall assembly U value and continuous insulation requirements.
   .1 Compressive Strength: ASTM D638 40,000 psi.
   .2 Compressive Modulus: ASTM D695 673,400 psi.
   .3 Shear Strength: ASTM D732 16,000 psi.

.4 Thermal Conductivity: ASTM C518 1.05 BTU in/ hr sf degree F.

.5 Coefficient of Thermal Expansion: ASTM E831 2.2 x 10e-6 in/in/degree F.

.6 Thermal Resistance (R value): ASTM C518 0.95 hr sf degree F/ BTU.

.7 Surface Burning Characteristics: ASTM E84.

.1 Flame Spread: 25 (class A).

.2 Smoke Developed: 50 (class A)

.8 Spacing: Refer to manufacturer's recommendations and comply with project specific calculations

.9 Connectors and Fasteners: Minimum ultimate pull-out capacity: 450 pounds.

.2 Framing Size/profile:

.1 Z-girt profile, depth to suit insulation thickness and air space as detailed.

.3 Acceptable product/manufacturer:

.1 Armatherm Z Girt

.2 GreenGirt by Smartci

.3 Cladding contractor to provide engineered support framing, including fastener specification to suit required cladding panel support.

2.4 Panel Support Framing (outer layer/vertical)

.1 Galvanized sheet steel, G90 (Z275) zinc coating and shall confirm to the applicable requirements of the latest version of ASTM 635M. Profile: z-girt or hat channel, 7/8" (22mm) thickness, or as recommended by panel manufacturer.

2.5 Continuous Air/Weather Resistant Barrier/Sheathing Membrane

.1 See Specification 07 27 00.

2.6 Continuous Air Barrier at Open Cladding Joints

.1 Water-resistive Barrier for Walls: Vapor permeable water-resistive barrier with tear-resistant thermo-bonded, non-woven polyester substrate and waterproof acrylic polymeric coating stabilized against oxidation and UV degradation [and factory applied adhesive edge strips].

1. Service Life Expectancy: > 25 years.
2. Weight: 5.5 lb/100 ft^2, 270 g/m^2, 44 lb/roll nominal.
3. Roll Dimensions: 4' 11" x 164'.
4. Color: Black

.2 Acceptable Material: Dörken Systems Inc., DELTA®-FASSADE S

.3 Accessories: Seam tapes/fasteners as recommended by manufacturer for a complete installation.

2.7 Sealants

.1 Refer to specification 07 92 00.

2.8 Flashing

.1 Reference: ASTM A653/A653M, "Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process".

.2 Submittals: Product Data: Submit manufacturer's specifications, application instructions, details and maintenance instructions.

.3 Materials: Prepainted sheet steel: ASTM A653/A653M; Classification LFQ, Grade A, Z275 zinc coating designation, 0.60 mm minimum base steel thickness, commercial quality, prefinished with

8,000+ Series coating system by U.S. Steel Canada, Pre-Coat 8000+ by Dofasco Inc. or Colourite WeatherX by Vicwest Steel. Colour: Colour as selected by Consultant.

.4 Execution:

.1 Form work neatly to size, shape and dimensions shown or required for the work. Make angles and lines in true alignment. Erect work straight, sharp, plumb and level in true plan, free of bulges and waves. Verify dimensions at the building. After soldering, remove flux or acid with neutralizing chemical, wash surface with water and then let dry, ready installation as applicable. Where welding is employed or indicated, employ mechanics skilled in welding metal being worked; grind exposed welds smooth to match adjacent surfaces and remove slag and splatter before priming. Use concealed fastenings except where approved before installation.

.2 Make allowances for expansion and contraction for material being used. Shop form, lap and solder or weld corners and angles into one piece 450 mm (1'-6") minimum each way from corner or angle. Hem drip legs of copings and flashings at 45 degrees and secure drips with nailed or screwed concealed continuous edge strips of same gauge and material. Use concealed fastenings wherever possible. Make "S-lock" type seams or "Standing" type seams. Make joints with opening away from prevailing winds. Install with joints and seams which will be permanently weatherproof.

PART 3 – EXECUTION

3.1 Inspection

1. Inspect the Work and notify the architect of any conditions that would affect the installation or performance of the Work.

3.2 Preparation

1. Verify site dimensions prior to commencement of the Work,
2. Clean and prepare to existing substrate to provide a surface free of frost, loose nails, dirt, debris or other contaminants that would adversely affect the installation of the breathable underlayment.
3. Seal all penetrations using a combination of tapes, self adhered membranes and other compatible sealants and products. Ensure all laps and details allow water to flow to the exterior
4. For vertical applications: start at base of wall, unroll sheathing membrane horizontally across wall. Extend 6” over starting corner. Fasten at top and bottom of roll within 2” of edge 12 “on centre and at a maximum of 2’ 0” on centre in field. Do not place vertical laps above windows.

3.3 Installation

1. Only installers approved by cladding manufacturer shall install panels.
2. Install panels, and accessories in accordance with manufacturer’s printed instructions and reviewed Shop Drawings.
3. Fasten panels with fasteners and equipment as recommended by the manufacturer.
4. Install panels with joints over middle of wall framing, maintain a 8mm gap between panels.
5. Keep minimum distance to corners and edges as recommended by the manufacturer.
6. Install panels true to line and level with clean cut edges and joints.
7. Seal around all items penetrating siding with sealant in accordance with Section 07 92 00.
8. Finished installation shall be properly secured, free of rattles, distortions, waviness, protrusions, damaged or chipped components.

3.4 Clean Up

1. Remove any concrete dust from cutting/drilling panels with clean water and a compressor hose or brush.
2. Upon completion of Work remove all equipment, tools, surplus materials and garbage.
3. Panel installation site shall be left in a clean condition free from construction debris.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

.1 Work of this section includes installing 2-ply Modified Bitumen membrane roofing over a steel deck, including but not limited to the following:

.1 Sheathing boards in adhesive

.2 Primer

.3 Self-adhesive Base Sheet Flashing

.4 Cold adhered Cap and Cap Sheet Flashing

1.2 REFERENCES

.1 Submit a report, certifying that the specified roofing system was tested in accordance with CSA A123.21-10, Standard test method for the dynamic wind uplift resistance of membrane-roofing systems.

.2 Membranes must meet or exceed requirements of ASTM D 6162, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.

.3 Membranes must meet or exceed requirements of ASTM D 6163, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.

.4 Membranes must meet or exceed requirements of ASTM D 6164, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.

.5 Polyisocyanurate thermal insulation boards must meet or exceed requirements of CAN/ULC S704-011, Thermal Insulation, Polyurethane and Polyisocyanurate, Boards Faced.

.6 Roofing system must meet or exceed requirements of CAN/ULC-S107-10, Methods of Fire Tests of Roof Coverings, Class C.

.7 Perform roofing and sheet metal work in conformance with the roofing manufacturer's written recommendations as well as the requirements of ULC laboratories Class C and Canadian Roofing Contractor’s Association (CRCA).

1.3 COMPATIBILITY

.1 All waterproofing materials will be provided by the same manufacturer.

1.4 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittals.

.2 Product Data: Submit manufacturer's technical product data, installation instructions, and recommendations for each type of roofing product required. Include data substantiating that materials comply with requirements.

.3 Shop Drawings: Submit roof plan showing layout of sloped insulation, slopes to drains, location of drains, and scuppers at the edges of the building. Sloped insulation layout drawings to be reviewed prior to installation.

.4 Maintenance Instructions: Submit manufacturer’s printed instructions for recommended maintenance of modified bituminous membrane roofing.

1.5 CONTRACTOR QUALIFICATIONS

.1 Roofing contractor shall have provided satisfactory installations similar to that specified during the past five (5) years. Submit, if requested, written list of successfully completed projects.

.

.3 Roofing contractor shall have a minimum of five (5) years' experience in the installation of built-up bituminous roofing.

1.6 MANUFACTURER'S REPRESENTATIVE

.1 The roofing product manufacturer can delegate a representative to visit the work site at the start of roofing installation.

.2 The contractor must at all times enable and facilitate access to the work site by said representative.

1.7 DELIVERY, STORAGE & HANDLING

.1 Deliver all material in original wrappings and containers with manufacturer's labels intact.

.2 Store all materials for membrane roofing work in strict accordance with manufacturer's recommendations.

.3 Store materials on wood pallets off the ground, covered on top and all sides, allowing for adequate ventilation and away from high heat, flames or spark.

.4 Store only as much material at point of use as required for each day's work.

.5 Protection of Insulation:

.1 Do not expose to sunlight, except to extent necessary for period of installation and concealment.

.2 Protect against ignition at all times. Do not deliver plastic insulating materials to project site ahead of installation time. Complete installation and concealment of plastic materials as rapidly as possible in each area of work.

1.8 WARRANTY

.1 Roofing Contractor's Warranty

.1 Provide a written OIRCA warranty for built-up bituminous roofing and membrane flashings in accordance with the General Conditions for a period of two (2) years from the date of Substantial Performance.

.2 The warranty shall cover materials. Labour, workmanship, tools and equipment to repair or replace all work judged to be defective by the Owner/Consultant and damage due to faulty or defective work including leaks in the roofing membrane, membrane flashing and related sheet metal work.

PART 2 -PRODUCTS

2.01 ADHESIVE

.1 Low-rise two-part urethane adhesive with no solvents. Allows a complete cure in few minutes, with no temperature restrictions.

.2 Specified product: DUOTACK INSULATION ADHESIVE by SOPREMA or equivalent per 01 25 00.

2.02 GYPSUM SHEATHING BOARD

.1 Sheathing board to ASTM C1177. Minimum 16 mm thick, glass mat faced, exterior grade gypsum board. Primed finish.

.2 Specified product: DensDeck Prime by Georgia Pacific or equivalent per 01 25 00.

2.03 PRIMER

.1 Stabilised primer to enhance adhesion of membranes.

.2 Specified product: ELASTOCOL STICK by SOPREMA (for self adhesive membranes) equivalent per 01 25 00.

2.04 ADHESIVE FOR MEMBRANES

.1 Modified bitumen membrane adhesive.

.2 Specified product: COLPLY EF ADHESIVE (for field membranes)

.3 Specified product: COLPLY EF FLASHING ADHESIVE (for flashing details)

2.05 MEMBRANES

.1 Roof membrane Base Sheet Flashing:

.1 CGSB 37-GP-56M, Type 2 for covered roofing application, Class C, Plain surfaced, Grade 2

.2 Roofing membrane with glass and polyester reinforcement and SBS modified bitumen to ASTM D6162. Top face sanded, under side self-adhesive. Top face marked with three (3) distinctive blue chalk lines to ensure proper roll alignment.

.3 Specified product: SOPRAPLY STICK DUO by SOPREMA or equivalent per 01 25 00.

.2 Roofing membrane Cap Sheet and Cap Sheet Flashing:

.1 CGSB 37-GP-56M, Type 1 for exposed roofing application, Class A, Granule surfaced, Grade 2

.2 ULC certifications, Class C

.3 Roofing membrane with composite of glass and polyester reinforcement and elastomeric bitumen to ASTM D6162. Top surface covered with ceramic granules, underface sanded.

.4 Specified products: COLPLY TRAFFIC CAP by SOPREMA or equivalent per 01 25 00.

2.06 WATERPROOFING MASTICS

.1 Waterproofing products: Mastic made of synthetic rubbers, plasticized with bitumen and solvents.

.1 Specified product: SOPRAMASTIC by SOPREMA or approved equivalent.

.2 Specified product: SOPRAMASTIC ALU by SOPREMA. (for exposed areas)

2.07 WATERPROOFING OF PENETRATIONS

.1 One component polyurethane /bitumen resin to waterproof roof penetrations and complex details.

.2 Specified product: Alsan Flashing and Alsan Flashing reinforcement by Soprema

PART 3 - EXECUTION

3.1 PROTECTION

.1 Face of buildings to be tarped, where necessary, to prevent damage to wall finish during roofing operations.

.2 Damage to inside of buildings during roofing operations will be repaired at no additional costs to Owner.

.3 Clean off drips and smears of bituminous materials.

.4 Prevent traffic over completed roofing except where required by work above roof level. Comply with precautions deemed necessary by Consultant. Repair damage caused by non-compliance with Consultant's requirements.

.5 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed work and materials out of storage.

.6 When work must continue over finished roofing membrane before insulation is applied, protect surface with minimum 12.7 mm (1/2") thick plywood.

.7 Fence off areas at ground level where equipment is to be used.

3.2 SURFACE EXAMINATION AND PREPARATION

.1 Surface examination and preparation must be completed in conformance with instructions in the membrane manufacturer’s technical documentation.

.2 Before roofing work begins, the owner's representative and roofing foreman will inspect and approve deck conditions (including slopes and wood grounds) as well as flashings at parapets, roof drains, plumbing vents, ventilation outlets and other construction joints. If necessary, a non-conformity notice will be issued to the contractor so that required corrections can be carried out. The start of roofing work will be considered as acceptance of conditions for work completion.

.3 Do not begin any portion of work before surfaces are clean, smooth, dry, and free of ice and debris. Use of calcium or salt is forbidden for ice or snow removal. No materials will be installed during rain or snowfall.

3.3 METHOD OF INSTALLATION

.1 Prepare surfaces and complete waterproofing work in conformance with manufacturer’s requirements, and the "Material Installation Guide"

.2 Install roofing elements on clean and dry surfaces, in conformance with manufacturer's instructions and recommendations.

.3 Roofing work must be completed in a continuous fashion as surfaces are prepared and weather conditions permit.

.4 Ensure watertight conditions for roofs at all times, including protection during installation work by other trades and progressive protection as work is completed (e.g. vents, drains, etc.)

3.4 INSTALLATION OF SHEATHING BOARD

.1 Lay sheathing board with tightly butted joints. Longitudinal joints must be at right angles to flute direction. Joints occurring along widths of board to be continuously supported on top flute of metal deck.

.2 Apply boards to substrate with specified adhesive, applied in 2 cm wide bands every 30 cm (12”) on center. Decrease the spacing between ribbons to a minimum of 15 cm (6”) at the perimeter and 10 cm (4”) at the corners.

.3 Ensure sheathing is immediately protected with membrane

3.5 APPLICATION OF ASPHALT PRIMER

.1 Prime all roofing substrates of wood, metal, concrete, masonry or gypsum board surfaces at a rate of 0.2 to 0.3 l/m^2 (none required for factory-painted metals). Ensure all surfaces to be primed are free of rust, dust or any residue that may hinder adherence. Cover primed surfaces with roofing membrane as soon as possible. Application temperature limit -10°C.

3.9 BASE-SHEET FLASHING INSTALLATION

.1 Apply primer to the substrate at a rate of .25 L/m2. Allow primer to dry before installation of Base Sheet

.2 Install reinforcing gussets at all inside and outside corners

.3 Install base sheet flashing in one- (1) metre widths to cover roofing substrate over 100 mm. Overlap side laps by 75 mm. Stagger side laps by at least 100 mm from base sheet overlaps on roof to avoid excessive layering.

.4 Apply base sheet flashing directly onto substrate by removing siliconed paper cover sheet. Proceed from top to bottom. Once in place, apply pressure manually in a uniform fashion to obtain homogenous adherence over entire surface. Preferably seal seams with rubber roller. Nail outside edge at 300 mm o/c.

.5 Avoid forming wrinkles, air pockets or fishmouths.

.6 Always seal overlaps at the end of the workday.

3.10 CAP SHEET FLASHING INSTALLATION

.1 Install this cap sheet in one-metre-wide strips (3.25 ft).

.2 Overlap each selvedge with the previous one laterally along lines provided for this purpose, and by 150 mm (6 in) the field surface. Space membranes for flashings at least 100 mm (4 in) with respect to the cap sheet membranes on the field surface, to avoid areas of excessive membrane thickness.

.3 Cut off corners at end laps at areas to be covered by the next roll.

.4 Use a chalk line to draw a straight line on the field surface 150 mm (6 in) from the flashings and parapets.

.5 Adhere the first 50 mm (2.0 in) of the side laps with adhesive, then heat-weld the last 50 mm (2.0 in) using an electrical hot-air welder and a membrane roller.

.6 Install the cap sheet in a full bed of adhesive applied at the rate of 6 to 8 litres per 10 m2 using a neoprene squeegee with 5 mm (3/16 in) notches. Apply adhesive for the first 125 mm (5 in) of the end laps with a steel trowel with 5 mm (3/16 in) notches. Complete the application by welding the last 25 mm (1 in) of the end laps using an electric hot-air welder and a membrane roller.

.7 Immediately after placing the cap sheet membrane on the adhesive, apply pressure on the surface to ensure complete and uniform adherence.

.8 Avoid the formation of wrinkles, swellings or fishmouths.

3.11 WATERPROOFING OF PENETRATIONS:

.1 Ensure substrate is clear of loose granules and all foreign substances that can impair adhesion.

.2 Apply a base coat of liquid waterproofing

.3 Trim reinforcing material to conform to shape of penetrations and embed in base coat.

.4 Apply a second coat fully saturating the reinforcement.

.5 To add colour or match existing granules, apply a thin coat of liquid waterproofing and embed granules before it dries.

3.12 DEFECTIVE WORK

.1 Guarantee does not release responsibility for roofing defects.

.2 The following failures shall be considered defective work:

.1 Undue (excessive) expansion or movement of membrane, splitting, tearing or fishmouthing of membrane.

.2 Leakage through membrane.

.3 Lifting deformation, loosening of membrane.

.3 Membrane repairs shall be same as sheet surfacing, patch shall be not less than 1 metre wide x 1 metre long.

3.13 ADJUSTING AND CLEANING

.1 All drips or smears on exposed finished surfaces or on surfaces to be subsequently finished, shall be repaired, removed and cleaned immediately.

.2 All adjacent surfaces shall be protected from damage due to membrane roofing operations.

.3 Clean all debris from deck areas and surrounding yard compound.

END OF SECTION

1.0 GENERAL

1.1 SUMMARY

.1 Section Includes: Furnishing of all labour, materials, services and equipment necessary for the supply and installation of metal flashings, sheet metal work, trim and associated accessories as indicated on Drawings and as specified herein.

1.2 REFERENCES

.1 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), "Sheet Metal Work Architectural Manual".

.2 ASTM A653/A653M, "Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process".

.3 ASTM C920, Specification for Elastomeric Joint Sealants.

.4 CAN/CGSB 37.5-M, Cutback Asphalt Plastic Cement.

.5 CSA A231.1/A231.2, Precast Concrete Paving Slabs/Precast Concrete Pavers.

.6 CSA B111, Wire Nails, Spikes and Staples.

.7 CRCA Roofing Manual, Canadian Roofing Contractors Association.

1.3 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00, indicating:

.1 Proposed method of shaping, forming, jointing.

.2 Fastening, and application of flashing and sheet metal work.

.2 Product Data: Submit manufacturer's Specifications, application instructions, details and maintenance instructions.

.3 Samples: Submit duplicate 300 mm (12") long samples of each type of sheet metal part made from gauge specified with colour finish.

2.0 PRODUCTS

2.1 SHEET METAL MATERIALS

.1 All materials under Work of this Section, including but not limited to, sealants are to have low VOC content limits.

.2 Prepainted sheet steel: ASTM A653/A653M; Classification LFQ, Grade A, Z275 zinc coating designation, 0.60 mm minimum base steel thickness, commercial quality, prefinished with 8,000+ Series coating system by U.S. Steel Canada, Pre-Coat 8000+ by Dofasco Inc. or Colourite WeatherX by Vicwest Steel. Colour: Colour as selected by Consultant.

2.2 MISCELLANEOUS MATERIALS & ACCESSORIES

.1 Plastic cement: CAN/CGSB 37.5-M.

.2 Sealant: ASTM C920, Type S, Grade NS, Class 25; High-performance, medium-modulus, one-part, neutral-cure silicone sealant. ‘CWS’ by Dow Corning and/ or equivalent.

.3 Starter strips: Starter strips to be continuous, of same material as flashing used, 1.2 mm thick.

.4 Fasteners: CSA B111; Flat head roofing nails of length, type and thickness suitable for metal flashing application.

.5 Washers: of same material as sheet metal, 1 mm thick with rubber packings.

.6 Touch-up paint: Same colour and material as prepainted sheet steel, as recommended by prefinished coating manufacturer.

.7 Scuppers: Fabricate scuppers from copper sheet. Provide with soldered joints, size scuppers as shown on Drawings. Make watertight connections between scupper and adjacent roof and wall construction or other flashings. Shop coat as specified.

.8 Metal Accessories: Provide sheet metal clips, straps, anchoring devices and similar accessory units as required for installation of Work, matching or compatible with material being installed, non-corrosive, size and gauge required for performance. All screws and parts shall be compatible to prevent electrolysis.

2.3 FABRICATION

.1 Fabricate copings, flashings, curb counter flashings, starter strips, and miscellaneous flashings in accordance with CRCA and to details shown.

.2 Breakform prepainted sheet material to shapes shown. Make end joints where adjacent lengths of metal flashing meet, in accordance with jointing method specified.

.3 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.

.4 Hem exposed edges 13 mm minimum on underside for appearance and stiffness. Mitre and seal corners with sealant

3.0 EXECUTION

3.1 INSTALLATION

.1 Comply with manufacturer's installation instructions and recommendations, CRCA Standards Manual.

.2 Form Work neatly to size, shape and dimensions shown or required for the Work. Make angles and lines in true alignment. Erect Work straight, sharp, plumb and level in true plan, free of bulges and waves. Verify dimensions at the building. After soldering, remove flux or acid with neutralizing chemical, wash surface with water and then let dry, ready installation as applicable. Where welding is employed or indicated, employ mechanics skilled in welding metal being Worked; grind exposed welds smooth to match adjacent surfaces and remove slag and splatter before priming. Use concealed fastenings except where approved before installation.

.3 Make allowances for expansion and contraction for material being used. Shop form, lap and solder or weld corners and angles into one piece 450 mm (1'-6") minimum each way from corner or angle. Hem drip legs of copings and flashings at 45 degrees and secure drips with nailed or screwed concealed continuous edge strips of same gauge and material. Use concealed fastenings wherever possible. Make "S-lock" type seams or "Standing" type seams. Make joints with opening away from prevailing winds. Install with joints and seams which will be permanently weatherproof.

.4 Provide roof penetration flashings of prefinished steel sheet. Construct over curbs Projecting above roof surface. Edges shall lap roofing at least 100 mm (4"). Form hemmed drip on bottom edge. Turn up inside top edge to prevent run in over top. Corners shall be mitred and welded. Fasten down with lead headed or washered screws.

.5 Coping Flashings: Slope coping flashings to shed water to the inside of the roof.

.6 Expansion Provisions: Where lapped or bayonet-type expansion provisions in Work cannot be used, or would not be sufficiently weatherproof, form expansion joints of intermeshing hooked flanges, not less than 25 mm (1") deep, filled with mastic sealant (concealed within joints).

.7 Sealant Joints: Where movable, non-expansion type joints are required for proper performance of Work, form metal to Provide for proper installation of elastomeric sealant, in compliance with industry standards.

.8 Underlayment: Where metal is to be installed directly on cementitious or wood substrates, install a course of paper slip sheet over a course of composite membrane underlayment. Overlap seams of composite membrane underlayment at least 65 mm (2-1/2"). Roll entire membrane firmly and completely as soon as possible to minimize bubbles. Seal all terminations with a trowelled bead of mastic.

.9 Bed flanges of Work in a thick coat of bituminous roofing cement where required for waterproof performance.

3.3 CLEANING & PROTECTION

.1 Clean exposed metal surfaces, removing substances which might cause corrosion of metal or deterioration of finishes.

.2 Protection: Installer shall advise of required procedures for surveillance and protection of flashings and sheet metal Work during construction, to ensure that Work will be without damage or deterioration, other than natural weathering, at time of substantial completion.

END OF SECTION

1.0 GENERAL

1.1 DOCUMENTS

.1 This Section of the Specifications forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

1.2 SUMMARY

.1 Section Includes: Furnishing of all labour, materials, services and equipment necessary for the supply and installation of firestopping as required to maintain fire resistance ratings of new/existing assemblies indicated on drawings and schedules.

1.3 REFERENCES

.1 CAN4-S115-M85, "Standard Method of Fire Tests of Firestop Systems".

1.4 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 – Submittals Procedures.

.2 Product Data: Submit three copies of manufacturer's specification and installation instructions for each type of material required. Include data substantiating that materials comply with specified requirements.

.3 Shop Drawings: Submit shop drawings to show proposed material, reinforcement, anchorage, fastenings and method of installation. Construction details should accurately reflect actual job conditions.

.4 Samples: Submit duplicate 300 mm x 300 mm (12" x 12") samples showing actual firestop material proposed for project.

1.5 DELIVERY, STORAGE, & HANDLING

.1 Comply with manufacturer's recommendations for handling, storage and protection during installation.

.2 Do not allow materials to become wet or soiled, or covered with ice or snow.

1.6 JOB CONDITIONS

.1 Examine substrate and the conditions under which the insulation work is to be performed. Do not proceed with firestopping work until unsatisfactory conditions have been corrected.

1.7 FIRE-RESISTANCE RATINGS

.1 Ratings of firestop systems shall be not less than the fire-resistance ratings noted on drawings and required by authorities having jurisdiction for firestopping of the floor, wall, shaft, ceiling and roof assemblies involved.

.2 Ratings of firestop assemblies for service penetrations shall be not less than the fire resistance rating of the floor, wall, shaft, ceiling or roof assembly being penetrated.

.3 Use only ULC tested firestopping assemblies as approved by the Consultant prior to firestop installations.

2.0 PRODUCTS

2.1 MATERIALS

.1 Firestopping Systems: In accordance with CAN4-S115-M85. All firestopping systems installed shall be from single manufacturer. Trade Contractors shall coordinate with General Contractor.

.1 Accepted Products:

.1 "Fire & Smoke Containment Systems" by Tremco Ltd., Construction Division.

.2 "Fire barrier Firestop Systems" by A/D Fire Protection Systems Inc.

.3 "Fire Protection Products" by Electrical Products Division/3M.

.4 "Firestop Systems" by Hilti (Canada) Limited.

.5 Or approved alternative.

.2 Asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN4-S115-M85 and not to exceed opening sizes for which they are intended.

.3 Firestop System Rating: Equal to fire separation rating as noted on drawings.

.2 Service Penetration Assemblies: Certified by ULC in accordance with CAN4-S115-M85 and listed in ULC Guide No. 40 U19.

.3 Service Penetration Firestop Components: Certified by ULC in accordance with CAN4-S115-M85 and listed in ULC Guide No. 40 U19.13 and ULC Guide No. 40 U19.15 under the Label Service of ULC.

.4 Fire-resistance rating of installed fire stopping assembly not less than the fire-resistance rating of surrounding floor and wall assembly.

.5 Firestopping at openings intended for ease of re-entry such as cables: Elastomeric or resilient seal; do not use cementitious or rigid seal at such locations.

.6 Firestopping at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: Elastomeric or resilient seal; do not use a cementitious or rigid seal at such locations.

.7 Primers: To manufacturer's recommendation for specific material, substrate, and end use.

.8 Water (if applicable): Potable, clean and free from injurious amounts of deleterious substances.

.9 Damming and backup materials, supports and anchoring devices: To manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.

.10 Sealants for vertical joints: Non-sagging.

3.0 EXECUTION

3.1 PREPARATION

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

.2 Prepare surfaces in contact with firestopping materials to manufacturer's instructions.

.3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.

.4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.2 INSTALLATION

.1 Install firestopping material and components in accordance with ULC certification and manufacturer's instructions.

.2 Seal holes or voids made by through penetrations, poke-through termination devices, and un-penetrated openings or joints to ensure continuity and integrity of fire separation are maintained.

.3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.

.4 Tool or trowel exposed surfaces to a neat finish.

.5 Remove excess compound promptly as work progresses and upon completion.

3.3 INSPECTION

.1 Notify Consultant when ready for inspection and prior to concealing or enclosing firestopping materials and service penetration assemblies.

3.4 SCHEDULE

.1 Firestop at:

.1 Edges of floor slabs and rated roof slabs at slab edge covers, aluminum windows/curtain wall.

.2 Deflection space at top of fire-resistance rated masonry and gypsum board walls.

.3 Intersections of fire-resistance rated masonry walls to concrete and to gypsum board walls and of fire-resistance rated gypsum board walls to concrete and to masonry.

.4 Penetrations through fire-resistance rated masonry, concrete and gypsum board walls.

.5 Penetrations through fire-resistance rated floors, ceilings and roofs.

.6 Openings and sleeves installed for future use through fire separations.

.7 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.

.8 Firestopping around mechanical and piping assemblies penetrating fire separations by Division 20 - Mechanical. Firestopping systems and products to be coordinated with this specification section.

.9 Firestopping around electrical assemblies penetrating fire separations by Division 26 - Electrical. Firestopping systems and products to be coordinated with this specification section.

3.5 CLEAN-UP

.1 Remove excess materials and debris and clean adjacent surfaces immediately after application.

.2 Remove temporary dams after initial set of fire stopping and smoke seal materials.

END OF SECTION.

PART 1 – GENERAL

1.1 SECTION INCLUDES

.1 Labour, Products, equipment and services necessary for sealant Work in accordance with the Contract Documents.

.2 Work of this Section does not include sealants in firestopping and smoke sealed assemblies.

1.2 REFERENCES

.1 ASTM C834, Specification for Latex Sealants.

.2 ASTM C920, Specification for Elastomeric Joint Sealants.

.3 ASTM C1330, Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.

1.3 SUBMITTALS

.1 Product data: Submit copies of Product data in accordance with the Conditions of the Contract describing type, composition and recommendations or directions for surface preparation, material preparation and material installation.

.2 Samples: Submit following samples in accordance with the Conditions of the Contract.

.1 Two samples of sealant/caulking, for colour selection.

.2 Two samples of back-up material and primer for physical characteristics.

1.4 QUALITY ASSURANCE

.1 Qualifications: Work of this Section shall be executed by trained applicators approved by sealant manufacturer and having a minimum of 5 years proven experience.

1.5 SITE CONDITIONS

.1 Do not install materials when ambient air temperature is less than 5°C, when recesses are wet or damp, or to manufacturer's recommendations.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Arrange delivery of materials in original, unopened packages with labels intact, including batch number, and ensure that on-site storage is kept to a minimum. Do not store materials on site where there exists any danger of damage from moisture, direct sunlight, freezing and other contaminants.

1.7 WARRANTY

.1 Submit a warranty for Sealant Work in accordance with General Conditions, except that warranty period is extended to 2 years. Warrant against leakage, cracking, crumbling, melting, shrinkage, running, loss of adhesion and staining adjacent surfaces. Warranty shall be for complete replacement including affected adjacent Work.

PART 2 - PRODUCTS

2.1 Materials

.1 General:

.1 All materials under Work of this Section, including but not limited to, primers and sealants are to have low VOC content limits.

.2 Use materials as received from manufacturers, without additives or adulterations. Use one manufacturer's Product for each kind of Product specified.

.2 Sealant **Type A**: ASTM C920, Type M, Grade NS, Class 25; Two-part, Polyurethane non-sag type, in standard colours selected.

.1 Sikaflex 2C-NS by Sika Canada Inc.

.2 Dymeric 240 by Tremco Ltd.

.3 Sealant **Type B**: ASTM C920, Type S, Grade NS; One-part mildew-resistant silicone, in standard colours selected.

.1 786 Mildew Resistant Silicone Sealant by Dow Corning Inc.

.2 Tremsil 200 Silicone Sealant by Tremco Ltd.

.4 Sealant **Type C**: ASTM C834; Pure acrylic siliconized sealant; in standard white colour (paintable).

.1 Tremflex 834 Silconized Sealant by Tremco Ltd.

.2 CRL 800 Acrylic Latex Caulk with Silicone by CR Laurence Ltd

2.2 Accessories

.1 Primers: Type recommended by material manufacturers for various substrates, primers to prevent staining of adjacent surfaces encountered on project.

.2 Joint backing: ASTM C1330; Round, solid section, closed cell, skinned surface, soft polyethylene foam gasket stock, compatible w ith primer and sealant materials, 30 to 50% oversized, Shore A hardness of 20, tensile strength 140 to 200 kPa. Bond breaker type surface.

.3 Bond breaker: Type recommended by material manufacturers.

.4 Void filler around the window frames to be one part expanding polyurethane foam.

.5 Cleaning agents: As recommended by material manufacturer, non-staining, harmless to substrates and adjacent finished surfaces.

2.3 Mixing

.1 Follow manufacturers instructions on mixing, shelf and pot life.

PART 3 – EXECUTION

3.1 Preparation

.1 Prepare joints to receive sealants to manufacturer's instructions. Ensure that joints are clean and dry and ferrous surfaces are free from rust and oil.

.2 Clean recesses to receive sealant, to be free of dirt, dust, loose material, oil, grease, form release agents and other substances detrimental to sealant's performance.

.1 Remove lacquer or other protective coatings from metal surfaces, without damaging metal finish, using oil-free solvents. Remove rust, mill scale and coatings from ferrous metals by wire brush, grinding or sand blasting.

.2 Ensure recess is dry.

.3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings. Remove incompatible coatings as required.

.3 Ensure that all materials in contact with sealant are compatible. Test substrate for adhesion.

.4 Depth of recess: Maintain depth to ½ joint width up to a maximum of 13 mm and not less than 6 mm at centre of joint. For greater depth, use joint backing under. Where recess is less than specified depth, cut back surface of recess to specified recess depth.

.5 Install polyethylene backing rod in joints 6 mm or more in width. Roll backing rod into joint. Do not stretch or bend backing rod. Install bond breaker to back of recess.

.6 Prime sides of recess, in accordance with sealant manufacturer's instructions.

.7 Condition products for use in accordance with manufacturer’s recommendations.

3.2 Installation

.1 Apply sealant immediately after adjoining Work is in condition to receive such Work. Apply sealant in continuous bead using gun with correctly sized nozzle. Use sufficient pressure to evenly fill joint.

.2 Ensure sealant has full uniform contact with, and adhesion to, side surfaces of recess. Superficial painting with skin bead is not acceptable. Tool sealant to smooth stains or other defects.

.1 At recesses in angular surfaces, finish sealant with flat profile, flush with face of material at each side.

.2 At recesses in flush surfaces, finish compound with concave face, flush with face of material at each side.

.3 Make sealant bead uniform in colour.

.4 Cure sealants in accordance with sealant manufacturer's instructions. Do not cover up sealants until proper curing has taken place.

.5 Immediately remove excess compound or droppings which would set up or become difficult to remove from adjacent finished surfaces, using recommended cleaners, as work progresses. Do not use scrapers, chemicals or other tools which could damage finished surfaces. Remove defective sealant.

.6 Clean recesses and re-apply sealant.

.7 Remove masking tape immediately after joints have been sealed and tooled.

3.3 Cleaning

.1 Clean surfaces adjacent to joints, remove sealant smears or other soiling resulting from application of sealants. At metal surfaces, remove residue. Do not mar or damage finishes on materials adjacent to joints. Repair or replace marred or damaged materials.

3.4 Schedule of Locations

.1 Following sealant location schedule is included for convenience and may not be complete. Examine Contract Drawings and other specification sections and determine entire extent of Work of this Section. Generally seal following locations:

.1 Concrete, masonry, wood and stone to metal.

.2 Wood to masonry, concrete and stone.

.3 Metal to metal.

.4 Junctions between all dissimilar materials.

.2 Sealant **Type A**:

.1 Exterior joints between masonry and steel or aluminum.

.2 Exterior joints between masonry and shelf angle.

.3 Exterior joints between steel or aluminum and concrete or masonry.

.4 Interior and exterior control joints, except in floors.

.5 Door frames, louvre frames, interior and exterior side.

.6 Protrusions through interior and exterior walls and floors, interior and exterior side, except where fire rated seals are required.

.7 Seal thresholds.

.3 Sealant **Type B:**

.1 Control joints in tiled areas (walls).

.2 Between vanity and tile.

.3 Between vanity and mechanical fixtures/fittings.

.4 Between access panels and tile.

.5 Between tiles and adjacent materials/fixtures/fittings.

.4 Sealant **Type C:**

.1 Perimeter of interior windows.

.2 Perimeter of firehose cabinets.

.3 Junction between drywall and masonry.

.4 Junction between interior door frames and adjacent partition.

.5 Junction between baseboards/trims/casings and adjacent partition.

END OF SECTION

PART 1 - GENERAL

1.1 Work Included

As detailed or scheduled in the contract documents, supply only of:

.1 Steel frame products including frames, transom frames (glazed or paneled), sidelight and window assemblies, fire-rated and non-rated.

.2 Sound retardant steel frame products, including frames, transom frames, sidelight and window assemblies, glazed or paneled, fire-rated and non-rated, including frame gasketing system.

.3 Steel panels, fixed or removable, flush or rabbetted, similar in construction to steel doors, for use in steel frame product.

.4 Steel doors, swing type, flush, with or without embossed face sheets, with or without glazed or louvered openings, fire-rated, with or without temperature rise ratings, and non-rated.

1.2 References

.1 ANSI/NFPA 80-1999, Standard for Fire Doors and Fire Windows

.2 ASTM A653/A653M-05a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process

.3 ASTM C553-02, Specification for Mineral Fiber Blanket Insulation for Commercial and Industrial Applications

.4 ASTM C578-05, Specification for Rigid, Cellular Polystyrene Thermal Insulation

.5 ASTM C591-01, Specification for Un-Faced Pre-formed Rigid Cellular Polyisocyanurate Thermal Insulation

.6 ASTM C592-04, Specification for Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction

.7 ASTM C1289-05a, Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board

.8 CAN4-S104-M80, Standard Method for Fire Tests of Door Assemblies

.9 CAN4-S106-M80, Standard Method for Fire Tests of Window and Glass Block Assemblies

.10 CGSB 41-GP-19MA (1984), Rigid Vinyl Extrusions for Windows and Doors

.11 CSA W59-2003, Welded Steel Construction (Metal Arc Welding)

.12 CSDMA, Recommended Dimensional Standards for Commercial Steel Doors and Frames, 2000

.13 CSDMA, Selection and Usage Guide for Steel Doors and Frames, 1990

.14 CSDMA, Recommended Specifications for Commercial Steel Door and Frame Products – 08 11 00, 2006

1.3 Submittals

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

.2 Indicate each type of door, frame, steel, construction and core.

.3 Indicate material thickness, mortises, reinforcements, anchorages, locations of exposed fasteners, openings (glazed, paneled or louvered) and arrangement of standard hardware.

.4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule of the Architect.

.5 Contractor responsible for coordination and installation of products provided under this Section shall;

.1 Verify and provide to the contractor responsible for the supply of steel door and frame products, actual opening sizes and field conditions by field measurement before fabrication. Submittal drawings shall reflect measurements and conditions provided, and product manufactured accordingly. Coordinate field measurements with fabrication and construction schedules to avoid delays.

.2 Verify that substrate conditions, whether existing or installed under other Sections, are as detailed in the Architect's drawings, and are acceptable for product installation in accordance with the manufacturer's instructions.

.6 Manufacturer shall not proceed with fabrication without receipt of approved submittal drawings and approved hardware schedule.

1.6 Warranty

.1 Materials and workmanship shall be warranted by the manufacturer for a period of one (1) year from date of substantial performance.

PART 2 - PRODUCTS

2.1 Materials

.1 Acceptable Materials: Steel doors and frame product manufactured in accordance with this Specification by CSDMA members, are eligible for use on this project.

.2 Steel: Commercial grade steel to ASTM A653, CS, Type B, Coating Designation ZF75 (A25) minimum. Minimum steel thicknesses shall be in accordance with Appendix 1 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products".

.1 Interior Doors: Face sheets shall be 0.042 in. (1.0 mm) minimum thickness.

.3 Door Core Materials

.1 Fiberglass: Loose batt type, density 24 kg/m3 (1.5 pcf) minimum, conforming to ASTM C553 or ASTM C592.

.2 Sound Retardant Composite: Core materials for such units shall be manufacturer's proprietary standard, tested as part of a fully operable assembly, including door, frame, and gasketing system, in accordance with ASTM E90 and ASTM E413 to provide the Sound Transmission Class (STC) and sound Transmission Loss (TL) values within the critical frequency range, as specified by the Consultant.

.4 Primers

.1 Rust inhibitive touch-up only.

.6 Miscellaneous

.1 Door Silencers. Single stud rubber/neoprene type.

.2 Exterior Top Caps. Rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19MA.

.3 Frame Thermal Breaks. Rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19MA.

.7 Glazing

.1 As per Specification 08 81 00.

2.2 Fabrication - Frame Products

.1 Interior frame product shall be 16 gauge. Interior frames and window assemblies shall be welded type construction. Interior transom frames shall be welded type construction. Interior sidelight assemblies shall be welded type construction.

.2 Frame product shall be mortised, blanked, reinforced, drilled and tapped at the factory for templated hardware only, in accordance with the approved hardware schedule and templates provided by the hardware supplier.

.3 Mortised cutouts shall be protected with steel guard boxes.

.4 Frame product shall be reinforced only, where required, for surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware. Drilling and tapping is by others, on site, at time of installation.

.5 Provide anchorage appropriate to floor, wall and frame construction and as detailed. Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb. For rebate opening heights up to and including 1520 mm (60") provide two (2) anchors, and an additional anchor for each additional 760 mm (30") of height or fraction thereof, except as indicated below. Frames in previously placed concrete, masonry or structural steel shall be provided with anchors located not more than 150 mm (6") from the top and bottom of each jamb, and intermediate anchors at 660 mm (26") on centre maximum. Fasteners for such anchors shall be provided by others.

.6 Minimum reinforcing, anchor and other component gauges shall be in accordance with Table 1 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products".

.7 Each door opening shall be prepared for single stud rubber door silencers, three (3) for single door openings, two (2) for double door openings, except on gasketed frame product.

.8 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.

.9 Fire-rated frame products shall be provided for those openings requiring fire protection as determined and scheduled by the Architect. Frames, transom and sidelight assemblies shall be listed for conformance with CAN4-S104. Window assemblies shall be listed for conformance with CAN4-S106. All fire-rated frame products shall bear the label of, and be listed by a nationally recognized testing agency having a factory inspection service. Labeling shall be in accordance with NFPA 80, the listing authority's policies and label materials, and shall identify the manufacturer. Fire-rated frame products shall be constructed as listed for labeling in the Follow-Up Service Procedures/Factory Inspection Manuals issued by the listing agency to individual manufacturers

.10 Provide grout guards fabricated from not less than 0.016 in. (0.4 mm) thick steel at all hardware mortises on frame product to be grouted (where applicable).

2.3 Welded Type Frames

.1 Frame product shall be accurately mitered or mechanically jointed.

.2 As defined in Appendix 2 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products", frame product perimeter corner joints shall be:

.1 Face welded; continuously welded on the profile faces, with exposed faces filled and ground to a smooth, uniform, seamless surface.

.3 Joints at mullions, sills and center rails shall:

.1 Be coped accurately, butted and tightly fitted.

.2 At intersecting flush profile faces, be securely welded, filled and ground to a smooth, uniform, seamless surface.

.3 At intersecting recessed profile faces, be securely welded to concealed reinforcements, with exposed hairline face seams.

.4 At all other intersecting profile elements, have exposed hairline face seams.

.4 Welding shall conform to CSA W59.

.5 Where frame product is to be installed prior to the adjacent partition, a floor anchor shall be securely attached to the inside of each jamb profile. Each floor anchor shall be provided with two

(2) holes for securing to the floor. For conditions that do not permit the use of a floor anchor, an additional wall anchor, located within 150 mm (6") of the base of the jamb, shall be substituted.

.6 Weld in two (2) temporary jamb spreaders per door opening to maintain proper alignment during shipment and handling, which shall not be used for installation.

.7 Glazing stops shall be formed steel channel, minimum 16 mm (0.625") height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.

.8 When required due to site access, when advised by the contractor responsible for coordination or installation, as specified on the Architect's drawings or due to shipping limitations, frame product for large openings shall be fabricated in sections as designated on the approved submittal drawings, with splice joints for field assembly and welding by others.

.9 Prior to shipment, mark each frame product with an identification number as shown on the approved submittal drawings.

.10 Refer to drawings/details/schedules for frame depth/throat opening sizes

2.4 Acoustic Frames

.1 Frame product shall be manufacturer's proprietary standard construction, tested as part of a fully operable assembly, including door, frame, glazing and gasketing system, in accordance with ASTM E90 and ASTM E413 to provide the Sound Transmission Class (STC) and sound Transmission Loss (TL) values within the critical frequency range, as specified by the Consultant.

2.5 Fabrication – Doors

.1 General

.1 Interior doors shall be laminated core construction.

.2 Longitudinal edges shall be continuously welded, filled and sanded with no visible edge seams.

.3 Doors shall be mortised, blanked, reinforced, drilled and tapped at the factory for template hardware only, in accordance with the approved hardware schedule and templates provided by the hardware supplier.

.4 Holes 12.7 mm (0.5") diameter and larger shall be factory prepared, except mounting and through-bolt holes, which are by others, on site, at time of hardware installation. Holes less than 12.7 mm (0.5") diameter shall be factory prepared only when required for the function of the device (for knob, lever, cylinder, thumb or turn pieces) or when these holes over-lap function holes.

.5 Doors shall be reinforced only, where required, for surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware. Drilling and tapping is by others, on site, at time of installation.

.6 Top and bottom of doors shall be provided with inverted, recessed, welded steel channels. Exterior doors, and where otherwise scheduled by the Architect, shall be provided with flush steel top caps.

.7 Minimum reinforcing and component gauges shall be in accordance with Table 1 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products".

.8 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.

.9 Fire-rated doors shall be provided for those openings requiring fire protection and temperature rise ratings, as determined and scheduled by the Architect. Such products shall be listed for conformance with CAN4-S104. All fire-rated doors shall bear the label of, and be listed by a nationally recognized testing agency having a factory inspection service. Labeling shall be in accordance with NFPA 80, the listing authority's policies and label materials, and shall identify the manufacturer. Fire-rated doors shall be constructed as listed for labeling in

the Follow-Up Service Procedures/Factory Inspection Manuals issued by the listing agency to individual manufacturers.

.10 Prior to shipment, mark each door with an identification number as shown on the approved submittal drawings.

.2 Laminated Core Construction

.1 Both face sheets for interior doors shall be formed from a sheet of 16 gauge steel.

.2 Doors shall be reinforced with vertical stiffeners, securely laminated to each face sheet at 150 mm (6") on center maximum.

.3 Voids between vertical stiffeners shall be filled with fiberglass batt type insulation.

2.6 Acoustic Doors

.1 Doors shall be manufacturer's proprietary construction, tested as part of a fully operable assembly, including door, frame, glazing and gasketing system, in accordance with ASTM E90 and ASTM E413 to provide the Sound Transmission Class (STC) and sound Transmission Loss (TL) values within the critical frequency range, as specified by the Consultant.

PART 3 - EXECUTION

.1 Site Storage and Protection of Materials

.1 Doors and frame product shall be removed from their wrappings or coverings upon receipt on site, be stored in a vertical position, and be spaced with blocking to permit air circulation between them.

.2 All materials shall be thoroughly inspected upon receipt and all discrepancies, deficiencies and/or damages shall be immediately reported, in writing, to the supplier.

.3 All damages incurred during shipment shall be noted on the carrier's Bill of Lading and immediately reported, in writing, to the supplier.

.4 Any scratches or disfigurement of doors or frame product caused by shipping or handling shall be promptly cleaned and touched-up with a zinc-rich primer.

.5 All materials shall be properly stored on planks or dunnage, out of water and covered to protect from damage from any cause.

.2 Installation

.1 Prior to installation, remove temporary shipping spreaders.

.2 Prior to installation, the area of floor on which the frame is to be installed, and within the path of the door swing, shall be checked and corrected for flatness.

.3 Door and frame product shall be checked for correct size, swing, rating and opening number.

.4 Caulk perimeter of frames between frame and adjacent material.

.5 Set frames plumb, square, level and at correct elevation.

.6 Fire-rated door and frame product shall be installed in accordance with the terms of their listings, NFPA-80, or the local Authority Having Jurisdiction (AHJ).

.7 Secure anchorages and connections to adjacent construction.

.8 Brace frames rigidly in position while building-in. Install wood spreaders at third points of frame rebate height to maintain frame width. Provide vertical support at centre of head for openings exceeding 1200 mm (48") in width.

.9 During the setting of frame product, check and correct as necessary for opening width, opening height, square, alignment, twist and plumb, in accordance with the CSDMA, "Recommended Dimensional Standards for Commercial Steel Doors and Frames".

.10 Grout guards and junction boxes are intended to protect hardware mortises and tapped holes from masonry grout of 4 in. (101 mm) maximum slump consistency that is hand troweled in place.

.11 Frame products are not intended or designed to act as forms for grout or concrete. Grout hollow metal sections in "lifts" or take precautions otherwise to ensure that frames are not deformed or damaged by the hydraulic forces that occur during this process.

.12 Keep hollow metal surfaces free of grout, tar, and/or other bonding materials or sealers. Promptly clean grout, tar, and/or other bonding materials or sealers off of frame product and doors.

.13 Remove wood spreaders after frames have been built-in.

.14 Make allowance for deflection to ensure structural loads are not transmitted to frame product.

.15 Install doors, and hardware in accordance with hardware templates and manufacturer's instructions.

.16 Adjust operable parts for correct clearances and function.

.17 Install louvers, glazing and door silencers.

.18 Finish paint in accordance with Section 09 91 00.

END OF SECTION

1.0 - GENERAL

1.1 References

.1 Architectural Woodwork Manufacturers Association of Canada (AWMAC)

.2 ANSI / WDMA I.S.1A - Window and Door Manufacturers Association (WDMA).

.3 CAN / CSA-0132.2.0-90 – General requirements for wood flush doors.

.4 ASTM E 2074-00 - Standard Methods of Fire Tests for Door Assemblies.

.5 UNDERWRITERS' LABORATORIES - UL 10B (Neutral Pressure) and UL 10C (Positive Pressure) - Fire Tests of Door Assemblies, and ULC S-104 Standard Methods of Fire Tests of Door Assemblies.

.6 NFPA 80 - Fire doors and other opening protectives

1.2 Shop Drawings

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

.2 Illustrate door opening information, such as: location, size, types, construction, swings, undercuts, special beveling, hardware location and preparation requirement, blocking for hardware in mineral core doors, fire ratings, identify cutouts, factory finish, glass and other pertinent data.

.3 Product Data. Indicate door core materials, thickness, construction, veneer species.

1.3 Samples

.1 Provide samples of door face veneer/finish for Architect’s approval.

1.4 Quality Assurance

.1 Manufacturer: Company specializing in manufacturing products specified in Section with a minimum of five years documented experience. Must be a member in good standing of the Architectural Woodwork Institute (AWI) and Quality Certification Program Certified (QCP). B.

.2 Quality Standard: Meet or exceed WDMA I.S.1-A Premium Grade

.3 Fire Ratings: Fire-rated wood doors to comply with NFPA 80 requirements according to building code standards having local jurisdiction.

.1 Neutral Pressure Testing – CAN/ULC S104; UL10B, NFPA252, and

.2 ASTM E-152. 2) Positive Pressure Testing – UBC 7-2-97 or UL10C.

.4 Label Certification: All doors requiring fire-rating will carry ULC label. Manufacturer's certification labels may be used for door size variations if approved by AHJ (Authority Having Jurisdiction).

1.5 Storage and Protection

.1 Protect doors from dampness. Arrange for delivery after work causing abnormal humidity has been completed.

.2 Store doors in well ventilated room, off floor, in accordance with manufacturer's recommendations.

2.0 – PRODUCTS

2.1 Wood Flush Doors

.1 Solid core, flush interior doors 44mm (1 ¾”) thick, solid core construction, WDMA workmanship for veneer faces, vertical edges, crossbands, horizontal edges and dimensional tolerances. Extra Heavy Duty Performance Level.

2.2 Materials

.1 Door Construction Grade: Except as otherwise shown on the drawings fabricate the work of this section to WDMA “Premium Grade”

.2 Door facing:

.1 MDF or hardboard overlay for paint finish.

.3 Doors to be one piece core construction, no voids. Stiles and rails to be electronically glue bonded to particle core prior to abrasive sanding.

.4 Core material to be structural composite lumber.

.5 Edge: hardwood painted/stained to match door face finish.

.6 Adhesive: Type II (water resistant) for interior doors.

.7 Finish: satin clear coat finish.

2.3 Fabrication

.1 Construction: SCLC 5.

.2 Doors edge construction: Type A

.3 Size of doors; type, size, and location of lights and louvers; astragals, edging, flashing, and specialty hardware; as indicated on Door Schedule/Details.

.4 Fire-rated doors of construction standard of manufacturer and conform to requirements of applicable labeling agencies.

.5 Provide blocking as required for surface mounted hardware to prevent need for through bolting.

.6 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 Door Construction

.1 No added urea-fomaldehyde in wood components and adhesives.

2.5 Interior Glass Glazing and Glazing Surface Films

.1 Refer to Specification 08 81 00.

3.0 - EXECUTION

3.1 Installation

.1 Unwrap and protect doors in accordance with CAN/CSA-O132.2 Series, Appendix A.

.2 Install doors and hardware in accordance with manufacturer's printed instructions [and CAN/CSAO132.2 Series, Appendix A].

.3 Adjust hardware for correct function.

3.2 Adjustment

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

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 Comply with requirements listed in Division 1

.2 Furnish, deliver and install finish hardware.

.3 It is intended that the following list of hardware will cover finish hardware to complete the project. Bring to the Architect's attention any omissions, discrepancies that will affect work in this section during the bidding period.

1.2 QUALITY ASSURANCE

.1 Meet all requirements of the local building code and all other applicable regulations.

.2 Qualified suppliers must have in their employ a Certified A.H.C. (Architectural Hardware Consultant) as licensed by the Door and Hardware Institute. The supplier must have a minimum of two (2) years experience furnishing hardware for similar projects. Only firms that can extend manufacturers warranty to the project are to be considered as suppliers.

.3 Inspection of supplied Finishing Hardware will be done by a Certified A.H.C. A complete Site Inspection Report will be issued to the Architect.

1.3 SUBMITTALS

.1 Upon request, provide mounted samples of hardware items to be supplied.

.2 Prepare and submit two (2) copies of a detailed hardware schedule listing product numbers, size and finishes. Include two (2) sets of catalog cuts.

.3 Furnish other sections with two (2) complete sets of hardware templates for related fabricating and installation.

.4 Submit for owner review and comments two (2) key schedules listing the door number, hardware heading or item, and the key group.

.5 Where electrical hardware is to be supplied, provide wiring diagrams showing all wire termination points. Where electrical hardware is to be supplied and installed provide the contractor with riser diagrams listing the correct wire runs and back box sizes as well as 115 VAC requirements.

.6 Where required in Division 1, provide two (2) operating manuals for the owners use. Include copies of the hardware schedule, templates, installation instructions and all maintenance data.

1.4 PRODUCT DELIVERY, HANDLING, AND STORAGE

.1 Deliver each hardware item in its original package complete with all fasteners, keys, templates, and installation instructions required for installation.

.2 Clearly mark each container with the door opening number and the hardware schedule item or heading number.

.3 The contractor must store hardware delivered in a secure area. The storage area must contain adequate shelf space to hold all the hardware off the floor. Ensure the area is kept dry and clean.

.4 When requested, package items of hardware separately for delivery to other fabricators for their installation.

1.5 WARRANTY

.1 Provide a written warranty for a period of two (2) years for all hardware supplied and a five (5) year warranty for the door closers.

.2 When requested provide extended warranties listed in Division 1.

PART 2 PRODUCTS

2.1 See Hardware Schedule

PART 3 EXECUTION

3.1 INSPECTION

.1 The consultant will inspect all the door openings to ensure the specified products are supplied and installed in accordance with the manufacturers instructions. A written report will be furnished to the Architect detailing openings where products are missing, installed incorrectly or in need of proper adjustment.

3.2 INSTALLATION

.1 The general contractor shall obtain a copy of ANSI/DHI A115.1G-94,"Installation Guide for Doors and Hardware". It is the intent of this document to be used as a reference guide in the proper handling, storage, and installation of finishing hardware, and doors and frames. This document can be obtained through the Door and Hardware Institute.

.2 Other trades installing hardware must follow all manufacturers instructions including door closer adjustment, handing of locksets as required, and degree of door swing. Advise the consultant if door frames are not square and plumb and prevent proper door hardware installation.

.3 Use only the original manufactures fasteners for the installation of all hardware products. Drill and tap doors and frames, where required, to properly install finishing hardware products.

.4 Mount hardware to suit door elevations. Unless otherwise directed by the consultant, install hardware at the following mounting heights:

Locksets/Card reader	43"	(1100mm)
Exit device	43"	(1100mm)
Push/Pull	42"	(1065mm)
Deadlock	48"	(1200mm)

.5 Manufacturers of specified products are responsible to instruct hardware installers in the proper installation methods of their products.

3.3 FIELD QUALITY CONTROL

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

.2 Perform bi-monthly on-site inspections during hardware installation and provide inspection reports listing progress of work, unacceptable work and corrective measures. Repair or replace as directed by the Consultant.

.3 Before completion of the work but after the hardware has been installed, submit a certificate to the architect stating that final inspection has been made and that hardware has been checked for installation and operation by a technician from the manufacturer and hardware consultant

3.4 ADJUSTING AND CLEANING

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

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

.3 Hardware to be left clean and free of disfigurements.

.4 Instruct owner personnel in the proper operation, adjustment and maintenance of hardware.

.5 Check locked doors against approved keying schedule.

3.5 PROTECTION

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

3.6 HARDWARE SCHEDULE

.1 See attached Schedule of Door Hardware

END OF SECTION

PART 1 - GENERAL

1.1 Summary

.1 Design, labour, Products, equipment, tools, and services necessary for glass and glazing Work in accordance with the Contract Documents.

.2 Decorative surface glazing films.

1.2 References

.1 Canadian Door and Window Manufacturers, Certification Program.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.

.2 CAN/CGSB-12.2-M91, Flat, Clear Sheet Glass.

.3 CAN/CGSB-12.3-M91, Flat, Clear Float Glass.

.4 CAN/CGSB-12.4-M91, Heat Absorbing Glass.

.5 CAN/CGSB-12.5-M86, Mirrors, Silvered.

.6 CAN/CGSB-12.6-M91, Transparent (One-Way) Mirrors.

.7 CAN/CGSB-12.8-97, Insulating Glass Units.

.8 CAN/CGSB-12.9-M91, Spandrel Glass.

.9 CAN/CGSB-12.10-M76, Glass, Light and Heat Reflecting.

.10 CAN/CGSB-12.11-M90, Wired Safety Glass.

.11 CAN/CGSB-12.12-M90, Plastic Safety Glazing.

.12 CAN/CGSB-12.13-M91, Patterned Glass.

.13 CAN/CGSB-12.20-M, Structural Design of Glass for Buildings

.3 Flat Glass Manufacturers Association (FGMA), Glazing Manual

1.3 Submittals

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures. Where indicated, Shop drawings shall be sealed by a qualified professional engineer licensed to designs structures and registered in Place of the Work.

.2 Samples:

.1 Submit following samples in accordance with Section 01 33 00.

.2 Submit one 300 x 300mm sample of ultra clear low iron glass

1.4 Closeout Submittals

.1 Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 Quality Assurance

.1 Installer shall comply with GANA (Glass Association of North America) - Glazing Manual other relevant standards, guidelines, and the Ontario Building Code

.2 Tempered glass:

.1 Tempered and heat strengthened glass shall be horizontally treated; vertical treatment will not be acceptable. Fabrication and treatment shall be such that distortion lines (where they occur) run horizontally (parallel to sill and head) after installation.

.2 Tempered glass shall bear the manufacturer's identification as to thickness. Such identification for glazing shall be permanently etched so as to be visible after glass has been installed. Glass other than fully tempered (FT) glass shall not have etched labels.

.3 Identification: Label each pane of glass and glass unit with type, thickness, quality, and colour of glass and with manufacturer's trade name

.4 Glazing: Glazing compounds and methods shall conform with applicable requirements of GANA Glazing Manual.

.5 Where glass and glazing is located less than 1m (40") above finished floor, it shall be designed as a guardrail as per OBC 4.1.5.14. and shall be tempered.

PART 2 – PRODUCTS

2.1 General:

.1 Glazing to be used for interior glass doors and partitions shall be heat treated to strengthen glass in bending to not less than 4.5 times annealed strength. Glass shall have minimal waviness or distortion and with all areas free of tong marks

2.2 Materials

.1 Ultra Clear Tempered Glass **(TGL)**: Ultra clear, low iron glass, tempered for indoor use shall conform to ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3

.1 Type 1: 6mm thick TGL all interior glass screens up to 1200mm in height

.2 Type 2: 12mm thick TGL all interior glass screens over 1200mm in height

.2 Laminated tempered glass **(LGL)**: to CAN/CGSB-12.1, Category II:

.1 Consisting of one layer of minimum 4 mm thick tempered glass, .3mm thick clear PVB interlayer, and one layer of minimum 3 mm thick clear tempered glass.

2.3 Surface Glazing Films

.1 Acceptable product: Milky Milky SH2MAMM by 3M Window Film or equivalent per Specification 01 25 00.

PART 3.0 - EXECUTION

3.1 Installation of Glazing

.1 Obtain field dimensions for each opening that is to receive glass and cut each glass to provide the optimal bit on, and clearance from, the sash or frame.

.2 Clean the surfaces that are to receive the glass and glazing materials. Surfaces shall be free of dirt, corrosion, residue, oils, and any other substance that may impair adhesion of glazing materials.

.3 Clean contact surfaces with solvent and apply primers to surfaces to receive tapes and sealants in accordance with the glass manufacturer's written instructions.

.4 Ensure all finishes are fully dry before installing the glazing.

.5 Seal porous glazing channels or recesses with substrate compatible primer or sealer. Prime surfaces scheduled to receive glazing compound.

.6 Do not perform glazing when ambient temperature is below 4 degrees Celsius

.7 Ensure humidity level is low before installation.

.8 Install glazing according to manufacturers' specifications.

.9 Ensure space between double-glazing is perfectly clean before installing the second panel.

3.2 General Glazing requirements:

.1 Comply with the general provisions of GANA Glazing Manual and the Ontario Building Code for minimum glazing requirements, and ensure that minimum frame lap (minimum grip of glass) and edge clearances are provided as required for the size of openings. Provide for expansion and contraction of glass as required.

.2 Conform with the manufacturers' latest published installation instructions and recommendations for glazing of tempered glass, laminated glass, and insulating glass. Follow manufacturer's latest published instructions for protection of edges and sizing of glass.

.3 Provide setting blocks at quarter points along the bottom of the glass pane. Blocks shall support the glass 1.5875 mm above the metal. Provide spacers to hold glass in centre between stops

.4 Provide spacers for glass panes where length plus width is greater than 1270 mm

.1 Locate spacers directly opposite each other on both inside and outside faces of the glass. Install correct size of spacers and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements

.2 Provide 3.2 mm minimum bite of spacers on glass and use thickness equal to sealant width.

.5 Adjust glazing channel dimensions as required by conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

.6 Protect glass edges from damage during handling and installation. Remove damaged glass from project site and dispose in accordance with municipal waste management and recycling requirements. Glass is considered to be damaged if edge damage, or other imperfections that, when installed, could weaken the glass and impair performance and/or appearance.

.8 Glazing of hollow metal doors and frames: glass shall be set around all edges with glazing gaskets hereinbefore specified. Provide setting blocks and spacers blocks as required. Set gasket legs on both sides of glass. Gasket shall be continuous, notched only at top rail in the centre. Compress gasket at least 15 percent to form a tight seal.

.9 For indoor glass panels: - set glass panes with proper orientation so that coating faces the correct specified direction

3.3 Installation of Glazing Film

.1 Clean surfaces thoroughly prior to installation.

.2 Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

.3 Install in accordance with manufacturer's instructions.

.4 Cut film edges neatly and square at a uniform distance of 1/8 inch (3 mm) to 1/16 inch (1.5 mm) of window sealant. Use new blade tips after 3 to 4 cuts.

.5 Spray the slip solution, composed of one capful of baby shampoo or dishwashing liquid to 1 gallon of water, on window glass and adhesive to facilitate proper positioning of film.

.6 Apply film to glass and lightly spray film with slip solution.

.7 Squeegee from top to bottom of window. Spray slip solution to film and squeegee a second time.

.8 Bump film edge with lint-free towel wrapped around edge of a 5-way tool.

.9 Upon completion of film application, allow 30 days for moisture from film installation to dry thoroughly, and to allow film to dry flat with no moisture dimples when viewed under normal viewing conditions.

3.4 Finishing

.1 Immediately remove sealant and compound droppings from finished surfaces. Remove labels after work is completed.

3.5 Cleaning and Replacement

.1 Upon completion of glazing, remove paint spots, splatters, and other blemishes from glass

.2 Assure that each light is identified as to type and grade of glass

.3 Remove and replace glass panes that are cracked or broken and where distortion is evident and distracting, as determined by the Consultant.

.4 Remove paper labels, wash, and polish glass just before acceptance by Consultant.

.5 Protect glass against damage from subsequent construction activities and damage.

END OF SECTION

1 GENERAL

1.1 SECTION INCLUDES

.1 Design, labour, Products, tool, equipment and services necessary for aluminum work in accordance with the Contract Documents.

1.2 REFERENCES

.1 AAMA 611, Voluntary Standards for Anodized Architectural Aluminum.

.2 AAMA CW-10, Care and Handling of Architectural Aluminum from Shop to Site.

.3 ANSI H35.1M, Alloy and Temper Designation Systems for Aluminum (Metric).

.4 ASTM A167, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

.5 ASTM B209M, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.6 ASTM B221M, Specification for Aluminum-Alloy Extruded Bars, Rods, Wires, Profiles and Tubes.

.7 ASTM C920, Specification for Elastomeric Joint Sealants.

.8 ASTM E283, Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

.9 ASTM E331, Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.

.10 ASTM F738M, Specification for Stainless Steel Metric Bolts, Screws, and Studs.

.11 CAN/CGSB 1.108-M, Bituminous Solvent Type Paint.

.12 CAN/CGSB 79.1-M, Insect Screens.

.13 CAN/ULC S702, Thermal Insulation, Mineral Fibre, for Buildings.

1.3 DEFINITION

.1 Aluminum work: Shall mean thermally broken aluminum windows, curtain wall, entrance doors, and bi-folding doors as outlined in Part 2 of this Specification Section.

1.4 DESIGN REQUIREMENTS

.1 Design aluminum work in accordance with following Climatic Design Data for **Oshawa** contained in the Ontario Building Code.

.2 Design aluminum work to accommodate following without producing detrimental effect:

.1 Cyclic 40°C daily thermal swing of components.

.2 Cyclic, dynamic loading and release of loads such as wind loads.

.3 13 mm vertical deflection in supporting structure and movement of supporting structure due to live, dead load, and creep or deflections, seismic load, sway displacement and similar items.

.3 Minimum condensation resistance expressed as Temperature Index (I) shall not be less than 59 as determined in accordance with CAN/SCA-A440.2 and using the following design conditions:

.1 Interior temperature: 20°C.

.2 Exterior temperature: -18°C.

.3 Interior RH: 30%.

.4 Restrict air infiltration/exfiltration, through aluminum work in accordance with ASTM E283 at pressure differential as indicated:

.1 Doors (per door): 2.78 m^3/h m per linear metre of crack at differential of 75 Pa.

.5 Design and detail controlled drainage path to actively discharge water, which enters into or forms within aluminum work, to exterior; prevent accumulation or storage of water within aluminum work. Prevent water from entering interior when tested in accordance with ASTM E331.

.6 Design and detail air barrier, vapour retarder, and rainscreen products and assemblies into continuous and integrated aluminum work envelope. Optimize aluminum work design to align envelope layers and to minimize thermal bridges.

.7 Prevent deflection and permanent or progressive glazing displacement. Restrict horizontal and vertical mullion deflection to less than L/175 (under uniformly distributed positive design wind load), and 10 mm maximum regardless of span.

.8 Design anchorage inserts for installation as part of other Sections of Work. Design anchorage assemblies to accommodate construction and installation tolerances.

.9 Provide all reinforcing within aluminum members as required by design and OBC to provide structurally sound assembly. In any case, mullion size shall not be increased due to provision of reinforcing.

.10 Design aluminum work and connections to substrate where the bottom of the aluminum work extends to a point below 1070 mm above finished floor level and separates a floor level from an adjacent interconnected space to withstand the required guard and handrail loads in accordance with the OBC and applicable local regulations. When requested by Consultant, provide a letter signed and sealed by a Professional Engineer certifying that the aluminum work conforms to the OBC requirements.

1.5 SUBMITTALS

.1 Shop drawings: Submit shop drawings in accordance with the Conditions of the Contract indicating:

.1 Plans, sections, details, type of extrusions, profiles, finishes, panels, operating components, doors, related flashings, closures, fillers, and end caps, and sealants.

.2 Products and glazing types.

.3 Anchorage inserts, system installation tolerances.

.4 Section and hardware reinforcement, anchorage, assembly fixings.

.5 Detailing, locations, and allowances for movement, expansion, contraction

.6 Path of cavity drainage and air pressure equalization.

.2 Samples: Submit two samples of following in accordance with the Conditions of the Contract.

.1 250 mm long samples of each type of extrusion and finish.

.2 250 x 200 mm samples of insulating glass unit.

.3 One complete corner detail of door frame, glazing, and finish for each door type.

.4 Each door and window hardware item for Consultant’s approval.

.3 Reports:

.1 Submit substantiating engineering data, and independent test results of pretested, aluminum work to substantiate compliance with the design criteria including air leakage and water penetration conforming to ASTM E283 and ASTM E331.

.2 Submit documentation to substantiate ten years of experience in aluminum window and door manufacture and installation.

.4 Close-out submittals: Submit window data for incorporation into the Operations and Maintenance Manual as part of the Conditions of the Contract.

1.6 QUALITY ASSURANCE

.1 Retain a Professional Engineer, licensed in Province of Ontario, with experience in aluminum work of comparable complexity and scope to perform the following services as part of the Work of this Section:

.1 Design of aluminum work.

.2 Review, stamp, and sign shop drawings.

.3 Conduct on-Site inspections and prepare and submit inspection reports.

.2 Mock-up:

.1 Fabricate, deliver, and erect one, full scale mock-up of each type of aluminum work, in location acceptable to Consultant.

.2 Demonstrate full range of Products, finishes, textures, quality of fabrication, and workmanship.

.3 Mock-up may form part of final Work, if acceptable to Consultant. Remove and dispose of mock-ups which do not form part of Work.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Handle aluminum work in accordance with AAMA CW-10.

.2 Protect aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather. Do not remove before final cleaning of building.

1.8 EXTENDED WARRANTY

.1 Submit a warranty for aluminum work in accordance with General Conditions, except that warranty period is extended to 5 years.

.1 Warrant against failure to meet the design criteria and requirements such as interior leakage, insulating glass unit failure, finish degradation, frame condensation.

.2 Coverage: Complete replacement including affected adjacent Work.

2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURER(S) AND SYSTEM(S)

.1 Thermally Broken Aluminum Curtainwall System (Basis-of-Design Product). To be used in exterior wall locations where scheduled: Kawneer 1600 System 1 thermally broken stick framed curtain wall system: 63.5mm x 152mm.

.2 Subject to compliance with performance requirements, comparable product by the following:

.1 ThermaWall 2600 Thermally Broken Curtainwall system by Alumicor.

.2 5500 HTP Series Thermally Broken Curtainwall system by Windspec.

.2 Thermally Broken Aluminum Exterior doors

.1 ‘425’ Series Thermal Entrance Doors by Kawneer Inc.

.2 ‘ThermaPorte 7700’ by Alumicor Limited.

.3 HTP Series by Windspec.

.3 Thermally Broken Aluminum Top Hung Bi-Fold Door (Basis-of-Design Product). To be used in exterior wall locations where scheduled:

.1 Series 1781 Bi-Fold Door System, 52.7mm top/bottom rail and capable of accepting 25mm sealed glass units, as manufactured by Commdoor.

.4 Fixed Aluminum Framed Windows (Basis of Design Product): Rainblade 1990 series, fixed, 114mm depth (or as detailed) architectural window as manufactured by Alumicor.

.1 Equivalent products as per Spec 01 25 00

2.2 MATERIALS

.1 All materials under Work of this Section, including but not limited to, sealants are to have low VOC content limits.

.2 Aluminum extrusions and channels: ASTM B221 and ANSI H35.1 AA6063 alloy, T6 temper.

.1 Profile and dimensions: Refer to Contract Drawings.

.2 Thermal breaks in frame members: Vertically aligned with glazing.

.3 Aluminum sheet: ASTM B209 and ANSI H35.1 AA1100 aluminum alloy, H14 temper, minimum 1.29 mm for sheets less than 610 mm wide and minimum 2.05 mm for sheets of a greater dimension.

.4 Reinforcements and anchors: ASTM A167, Type 304 to AISI No. 2B finish. Size as shown.

.5 Not used.

.6 Spandrel panel insulated panel airseal backpan: ASTM A653/A653M; 0.9 mm thick, Z275 galvanized steel sheet.

.7 Airseal and aluminum work sealant: ASTM C920, Type S, Grade NS, Class 100/50; One-part, low-modulus, moisture-curing, silicone. ‘Dow Corning 790' by Dow Corning; ‘Spectrem 1' by Tremco. Verify compatibility with insulating glass unit manufacturer's secondary sealant. Colour as selected by Consultant. Primer as recommended by manufacturer.

.8 Frame sealant: Type as recommended by the aluminum work manufacturer.

.9 Joint backing: Closed cell foam polyethylene rod, outsized minimum 30-50% larger than joint width and compatible with joint sealant. Product as recommended by sealant manufacturer.

.10 Airseal transition membrane as per Spec 07265

.11 Anchors, clips, and angles: Extruded aluminum or stainless steel.

.12 Shims and blocking for frame: Rigid plastic, wood is not permitted.

.13 Flashings, closures and trim: 1.0 mm minimum aluminum sheet, finish to match curtain wall/window framing finish.

.14 Screws, bolts and other fasteners: ASTM F738M; Stainless Steel Type 304.

.15 Isolation coating: CAN/CGSB-1.108-M; Bitumastic coating, acid and alkali resistant material.

.16 Spray Foam Insulation: CFC free, polyurethane foam in place, closed cell low expansion, one component, minimum density 15 kg/m3.

.1 'ENERFOAM' by Dow Chemical Canada.

.2 'IPF All Weather Pro' by Rivenco Industries.

.17 Weatherstripping: Durable, non-absorbing material resistant to deterioration by aging and weathering.

2.3 INTERIOR GLAZING

.1 Specification 08 81 00.

2.4 EXTERIOR GLAZING

.1 Materials

.1 Tempered glass **(TGL)**: CAN/CGSB-12.1-M, Type 2, Class B, Category II, minimum 6 mm thick, clear or tinted as per drawings/schedules.

.2 Laminated tempered glass **(LGL)**: to CAN/CGSB-12.1, Category II: Consisting of one layer of minimum 4 mm thick tempered glass, .2no coloured PVB interlayers, and one layer of minimum 3 mm thick clear tempered glass. Acceptable PVB interlayer manufacturer: Vanceva of equivalent per Spec 01 25 00.

.3 Insulating glass units: To CAN/CGSB-12.8-M and IGMA requirements utilizing approved non-metallic PVC or Fibreglass edge spacer in black. Dual seal with a PIB primary seal and silicone secondary seal.

.4 Argon gas: 100% pure.

.5 Low-E coating: High performance sputtered low-E coating. Provide insulating glass units with low-E coating edge deletion and low-E coating. Apply low-E coating to second surface unless otherwise indicated. Solarban 70XL by PPG Industries Inc, SunGuard SN68 by Guardian or equivalent capable of achieving performance values outlined in Section 2.3.

.6 Glazing and rebate primers, sealants, sealers, and cleaners: Compatible with each other. Type as recommended by glass manufacturer.

.7 Glazing sealant: Silicone sealant as recommended by glazing manufacturer. Verify compatibility with insulating glass unit secondary sealant.

.8 Heel & toe bead: Silicone sealant as recommended by glazing manufacturer.

.9 Glazing gasket: ‘Visionstrip’ by Tremco Ltd., extruded composite glazing seal, size as recommended by manufacturer.

.10 Glazing tape: ‘Polyshim II’ glazing tape EPDM shim.

.11 Glazing splines: EPDM or neoprene, extruded shape to suit glazing channel retaining slot, colour as selected.

.12 Setting blocks (regular): EPDM, 80 - 90 Shore A durometer hardness to ASTM D2240, 100 mm long x 6 mm high x rebate width minimum, size designed for glass size and weight of glass unit.

.13 Edge blocks: EPDM, 60-70 Shore A Durometer hardness, sized with 3 mm clearance from glass edge and spanning glass thickness(es). Capable of withstanding weight of glass unit, self adhesive on face.

.14 Glass presence markers: Easily removable, non-residue depositing.

.15 Isolation coating: CAN/CGSB 1.108-M; Bitumastic paint.

.16 Screws, bolts and fasteners: Type 304 stainless steel.

.2 Sealed Insulating Glass Units Type 1

.1 25mm overall thickness.

.1 Clear TGL outboard lite, minimum 6mm thickness.

.2 Low-E coating to #2 surface (as per 2.4.4).

.3 Hermetically sealed, dehydrated air space,

.4 Clear TGL inboard lite, minimum 6mm thickness.

.5 Glass Unit Performance Requirements:

.1 Visible Light Transmittance (VLT): 65 minimum

.2 U-Value: 0.25 (IP) minimum

.3 Solar Heat Gain Coefficient (SHG): .37 maximum

.3 Sealed Insulating Glass Units Type 2: As Type 1 above, with laminated tempered glass (LGL) at inboard lite.

2.5 Hardware (Bi-Folding Aluminum Door)

.1 Locking Devices: Euro style lock with cylinder exterior and thumb turn on interior.

.2 Pull Handle: Lever style handle

.3 Roller Assembly: Top hung roller assembly

.4 Hinges: Offset hinges to accommodate weight of panel

.5 Flushbolts:

.1 Top flushbolts, 8” (203.2mm), 16” (406.4mm), 24” (609.6mm), 39” (990.6mm)

.2 Bottom flushbolt 8” (203.2mm)

.6 Threshold: sloped threshold with recessed guide slot complete with drainage path to exterior.

2.5 FABRICATION

.1 Fabricate sections true to detail, free from defects impairing appearance, strength and durability. Fabricate extrusions with sharp, well defined corners.

.2 Fabricate aluminum work systems in accordance with reviewed shop drawings and manufacturer’s written instructions.

.3 Fabricate, fit, and secure framing joints and corners accurately, with flush surfaces, and hairline joints. Apply frame sealant at joints for weatherproof seams.

.4 Conceal anchors, reinforcement and attachments from view. Fabricate reinforcement in accordance with design requirements.

.5 Do not expose manufacturer's identification labels on aluminum assemblies.

.6 Fabricate continuous sill flashings with intermediate anchor clips, and joint reinforcing, form to profile shown. Fabricate filler and closure pieces as necessary for a complete and weather tight installation.

.7 Position operable windows on main frame to provide direction of opening specified, free and smooth operation, without binding or sticking against main frame members.

.8 Fabricate doors and frames complete with internal reinforcements, cut-outs, and recesses to accommodate finish hardware. Reinforce cut-outs to assure adequate strength.

.9 Fabricate aluminum work closures and trim from aluminum sheet. Form to profile shown. Make weathertight.

.10 Double weatherstrip windows and doors. Install weatherstripping in specially extruded ports and secure to prevent shrinkage or movement.

.11 Fabricate glazing recess with drainage to exterior.

2.6 FINISH

.1 Exterior extrusion finish: exposed aluminum surfaces to AA-M10C21A44, Architectural [Class I], anodized [18 µm (0.0007 inches)] minimum thickness coloured dark bronze.

.2 Interior exposed aluminum surfaces: to AA-M10C21A44, Architectural Class I, anodized [18 µm (0.0007 inches)] minimum thickness coloured dark bronze.

3 EXECUTION

3.1 INSTALLATION

.1 Install aluminum work in accordance with reviewed shop drawings, manufacturer's written instructions, and CSA A440/A440.1.

.2 Install Work of this Section securely, in correct location, level, square, plumb, at proper elevations, free of warp or twist.

.3 Apply isolation coating at 0.8 mm dry film thickness to prevent corrosive or electrolytic action between dissimilar materials such as aluminum to concrete, masonry, galvanized steel and similar conditions.

.4 Install flashings, closures, and trim pieces.

.5 Fill voids between aluminum framing and adjacent construction with foam insulation.

.6 Install sills in maximum lengths possible. For sills over 1200 mm in length, maintain 3 mm to 6 mm space at each end.

.7 Exterior glazing as per section 2.4 of this Specification, Interior glazing in accordance with Section 08 81 00.

.8 Automatic door operators to be supplied and installed by Section 08700. Install doors and hardware to manufacturers' written instructions. Clean and adjust hardware for correct performance.

.9 Install aluminum door manufacturer's standard weatherstripping at door frame perimeter. Install weatherstripping throughout entire length and width of doors at jambs and heads.

.10 Install doors and hardware to manufacturers' written instructions. Clean and adjust hardware for correct performance.

.11 Adjust operable parts for correct function.

.12 Remove damaged or unacceptable Products and assemblies from Site and replace to Consultant's acceptance.

.13 Install glass presence markers, in two cross stripes extending from diagonal corners. Maintain markers until final clean-up.

3.2 ERECTION TOLERANCES

.1 Tolerances: Non-cumulative.

.1 Maximum variation from plumb: 1.5 mm/3 m non-cumulative or 12 mm/30 m, whichever is less.

.2 Maximum misalignment of two adjoining members abutting in plane: 0.8 mm.

.3 Vertical and horizontal positions: +/- 3 mm.

.4 Racking of face: 6 mm, nil in elevation.

.5 Operable components: Consistent with smooth operation and weatherproof performance.

.6 Maximum perimeter sealant joint between aluminum work and adjacent construction: 13 mm.

3.3 GLAZING PERIMETER AIRSEAL

.1 Install glazing perimeter airseal at entire perimeter of each insulating glass unit to achieve an airseal from insulating glass unit to curtain wall frame. Do not obstruct path of cavity drainage and air pressure equalization.

.2 Perform sealant work in accordance with manufacturer’s written requirements.

3.4 AIRSEAL TRANSITION MEMBRANE

.1 Install primer and airseal transition membrane in accordance with manufacturer's instructions. Install airseal transition membrane into extrusion reglet as indicated ondrawings. If there is no extrusion reglet, mechanically fasten airseal transition membrane to frame with batten bar fastened at 150 mm o.c.

.2 Overlap airseal transition membrane 75 mm minimum and lap in direction of waterflow.

.3 Coordinate airseal transition to adjacent parts of Work.

3.5 JOINT BACKING AND ALUMINUM WORK SEALANT

.1 Prepare substrate surface and mask as recommended by sealant manufacturer.

.2 Install joint backing and sealant at aluminum work and perimeter joints for weather tight installation in accordance with sealant manufacturer's instructions. Tool sealant. Remove excess sealant.

3.6 CLEANING

.1 Maintain aluminum work, inside and outside, in clean condition throughout construction period.

.2 Remove labels, protective material, and glass presence markers from prefinished surfaces.

.3 Remove CSA A440/A440.1 certification labeling when directed by Consultant, in writing.

.4 Wash aluminum work with solution of mild detergent in warm water, with particular attention to recesses and corners. Wipe surfaces clean and dry.

END OF SECTION

PART 1 - GENERAL

1.1 References

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C1396 Standard Specification for Gypsum Board

.2 ASTM C 475-94, Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

.3 ASTM C 514-94, Specification for Nails for the Application of Gypsum Board.

.4 ASTM C 557-93a, Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.

.5 ASTM C 840-95, Specification for Application and Finishing of Gypsum Board.

.6 ASTM C 954-93, Specification for Steel Drill Screws for the Application of Gypsum Board.

.7 ASTM C 1047-94, Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.

.8 ASTM C1177-08, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing

.9 ASTM C1178M -08, Standard Specification for Coated Glass Mat Water Resistant Gypsum Backing Panel

.10 ASTM C1658-06, Standard Specification for Glass Mat Gypsum Panels

.11 ASTM C1629M-06, Standard Classification for Abuse Resistant Non Decorated Interior Gypsum Panel Products and Fiber Reinforced Cement Panels

.12 ASTM D3273-00, Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.2 CAN/CGSB-71.25-M88, Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.

.3 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S102-1988, Building Materials and Assemblies, Standard Method of Test for Surface Burning Characteristics of.

1.2 Site Environmental Requirements

.1 Maintain temperature minimum 10C, maximum 21C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.

.2 Apply board and joint treatment to dry, frost free surfaces.

PART 2 - PRODUCTS

2.1 Materials

.1 **Standard Gypsum Board**: to ASTM C1396, 12.7mm (1/2” thick) or 15.9mm (5/8” thick) as scheduled, 1200mm (4’-0”) wide x maximum practical length. Provide Type X where indicated/scheduled.

.2 **Glass Matt Tile Backerboard** for use throughout washrooms and at all areas scheduled to receive ceramic tile finish: treated water-resistant gypsum core that is covered with a coated fiberglass mat facer and back and has a proprietary coating surface; to ASTM C1178, 12.7mm (1/2”) thick, 1220mm (4’0”) wide x maximum practical length.

.3 **Exterior Gypsum Sheathing Board:** fiberglass mat on face/back/long edges manufactured to ASTM C1177, 15.9mm (5/8") thick unless noted otherwise, 1200mm wide x maximum practical length. Score of 10 (no mould growth) as per ASTM D3273, Microbial Resistance: will not support microbial growth as per ASTM D6329.

.4 Steel drill screws: to ASTM C 1002.

.5 Stud adhesive: to CAN/CGSB-71.25 ASTM C 557.

.6 Laminating compound: as recommended by manufacturer, asbestos-free.

.7 Shadow gap: Bailey D300 Metal trim, CGC Dur-a-bead or Nicolson Rollforming No 114, fillable edge trim, 0.55mm (0.022") base thickness commercial grade sheet steel with zinc wiped coating to ASTM A 525-93; perforated flanges; one piece length per location. To be used at the junction of all dissimilar materials and/or as detailed.

.8 Corner bead: Bailey D100-90, 90-degree corner trim fillable edge trim, 0.55mm (0.022") base thickness commercial grade sheet steel with zinc wiped coating to ASTM A 525-93; perforated flanges; one piece length per location.

.9 Control joints: No 093 Zinc Control Joints by CGC Inc or Nicholson Rollforming. To be installed to continue any existing base building control joints and/or where indicated on drawings.

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

.11 Acoustic sealant: concealed purpose made, non-skinning, non hardening type to CAN/CGSB-19.21-M87, as manufactured by Tremco or Monsey-Bakor, USE Hickson

.12 Sound attenuation insulation (acoustic batt insulation type 'C')

.1 Mineral or fiberglass sound attenuation batt or boards to ULC S702 and as required by fire rated tests.

.2 Thickness: full stud thickness or as otherwise stated on the Drawings and Schedule.

.13 Joint compound: to ASTM C 475, asbestos-free. Latex resin base, possessing good adhesion, mixed with fresh, unadulterated water having no detrimental effects on compounds. Type recommended by manufacturer for application indicated.

.14 Joint reinforcing tape; for gypsum board; 50mm (2") x 0.3mm (0.01") thick perforated paper with chamfered edges. **Use alkali resistant glass-fiber tape at tile backerboard locations**.

.15 1 hour rated walls to be filled with absorptive material processed from rock or slag with a mass of at least 2.8 kg/m^2 for 89mm thickness and completely filling the wall cavity.

PART 3 - EXECUTION

3.1 Erection

1 Do application and finishing of gypsum board in accordance with ASTM C 840 except where specified otherwise.

.2 Do application of gypsum sheathing in accordance with ASTM C 1280.

.3 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C 840 except where specified otherwise.

.4 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.

.5 Install work level to tolerance of 1:1200.

.6 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles.

.7 Install 19 x 64 mm furring channels parallel to, and at exact locations of steel stud partition header track.

.8 Furr for gypsum board faced vertical bulkheads within and at termination of ceilings.

.9 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.

.10 Install wall furring for gypsum board wall finishes in accordance with ASTM C 840, except where specified otherwise.

.11 Furr openings and around built-in equipment, cabinets, access panels, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.

.12 Furr duct shafts, beams, columns, pipes and exposed services where indicated

3.2 Application

.1 Do not apply gypsum board until bucks, anchors, blocking, electrical and mechanical work are approved.

.2 Apply 12 mm (1/2”) 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 in partitions where perimeter sealed with acoustic sealant.

3.3 Installation

.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150mm oc using contact adhesive for full length.

.2 Install casing beads around perimeter of suspended ceilings.

.3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.

.4 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.

.5 Install shadow mould at gypsum board junctures where indicated. Minimize joints; use corner pieces and splicers.

.6 Construct control joints of preformed units two back-to-back casing beads set in gypsum board facing and supported independently on both sides of joint.

.7 Provide continuous polyethylene dust barrier behind and across control joints.

.8 Locate control joints where indicated at changes in substrate construction at approximate 10m spacing on long corridor runs at approximate 15m spacing on ceilings.

.9 Install control joints straight and true.

.10 Construct expansion joints as detailed, at building expansion and construction joints. Provide continuous dust barrier.

.11 Install expansion joint straight and true.

.12 Splice corners and intersections together and secure to each member with 3 screws.

.13 Install access doors to electrical and mechanical fixtures specified in respective Sections.

.1 Rigidly secure frames to furring or framing systems.

.14 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.

.15 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.

.16 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.

.17 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

.18 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.

.19 Mix joint compound slightly thinner than for joint taping.

.20 Apply thin coat to entire surface using trowel or drywall broadknife to fill surface texture differences, variations or tool marks.

.21 Allow skim coat to dry completely for walls receiving high gloss paint and where indicated.

.22 Remove ridges by light sanding or wiping with damp cloth.

.23 Fasten board to metal support members by metal gypsum board screws at, 9.5mm (0.374”) minimum to , and 12.7mm (1/2”) maximum from, center of joints. Space screw:

.1 At ceilings of fire rated board at 200mm (8”) o.c. at edges and in field unless indicated otherwise.

.2 At walls of fire rated board at 200mm (8”) o.c. at edges and 305mm (12”) o.c. in field Locate screws opposite one another in adjacent panels unless indicated otherwise.

.3 At typical board walls at 400mm (16”) o.c. at edges and field unless noted otherwise.

.4 At typical board ceilings at 305mm (12”) o.c. at edges and field unless noted otherwise.

.24 When installing fiberglass mat faced mould and moisture resistant gypsum board do so as per manufacturers recommendations. Tape joints with self adhesive fiberglass tape and embed the tape in setting type compound. Finish joint with two layers of all purpose joint compound. High build primer should be applied to surface before painting. As with regular paper faced gypsum board, in areas where gloss paint is to be applied or in areas of critical light a skim coat should be applied to the surface before priming and painting.

3.4 Schedules

.1 Construct fire rated assemblies where indicated on drawings

END OF SECTION

PART 1 - GENERAL

1.1 Description of System

.1 Metal stud framing includes non-load bearing steel studs framing members for interior framing systems (eg., partition walls, framed bulkheads, furring, etc.) as well as interior suspension systems (eg., supports for ceilings, suspended bulkheads, etc.). Systems shall be engineered to resist lateral loading and support adjacent building components where indicated.

.2 Lightweight Steel Framing includes Lateral (Wind) Load-Bearing Lightweight Metal Framing System.

.1 Wall studs subjected to lateral loads

.2 Top and bottom connections to primary structural elements, including detailing to accommodate deflection

1.2 References

.1 CSA S136 North American Specification for the Design of Cold-Formed Steel Structural Members

.2 AISI North American Standard for Cold-Formed Steel Framing – Product Data

.3 ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

.4 ASTM A641/A641M Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

.5 ASTM A792/A792M Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process

.6 ASTM A1003 Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-coated for Cold-Formed Framing Members

.7 ASTM C645 Standard Specification for Nonstructural Steel Framing Members

.8 ASTM C754 Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products

.9 ASTM E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

.10 ASTM E413 Classification for Rating Sound Insulation

.11 ASTM E488 Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements

.12 ASTM E1190 Standard Test Methods for Strength of Power-Actuated Fasteners Installed in Structural Members

.13 CAN/ULC S101 Standard Methods of Fire Endurance Tests of Building Construction and Materials

.14 CSSBI LSF Technical Bulletin Volume 7, Number 1 Maximum Height Tables for Interior Non-Load Bearing Partitions.

1.3 Quality Assurance

.1 Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate nonload bearing interior steel framing, provide materials and construction identical to those tested in assembly indicated according to CAN/ULS-S101.

.2 STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413.

.3 Retain a Professional Engineer registered in the province of Ontario to design the Lightweight Steel Framing System where indicated in drawings; to prepare, seal and sign all shop drawings; and to perform field review. Shop drawings shall show both design and installation requirements.

1.4 Design Criteria

.1 Conform to the requirements of fire-rated assemblies as scheduled in drawings/details which have been tested in accordance with CAN/ULC-S101 and provide fire resistance ratings as indicated.

.2 For Interior non-load bearing studs, conform to minimum design thickness, web depth and flange width as outlined in CSSBI Maximum Height Tables for interior non-load bearing partitions.

.3 A non-load bearing (non-structural) member is defined as a member in a steel-framed system which is limited to transverse (out-of-plane) load of not more than 480 PA, a superimposed axial load, exclusive of sheathing materials, of not more than 1460 N/m, or a superimposed axial load of not more than 890 N.

.4 A load bearing (structural) stud may be used in a non-load bearing application; however, non-load bearing members (studs or track) may never be used in a load bearing (axial and/or wind loading) applications.

.5 Track for interior walls and non-load bearing walls located at exterior walls shall have a thickness of not less than the thickness of the corresponding studs and shall have not less than 31.8 mm flanges.

.6 Connections between light steel framing members shall be by sheet metal screws, welding or crimping.

.7 Lateral Load bearing assemblies/applications/details:

.1 Design shall be based on Limit States Design principles using factored loads and resistances.

.2 Loads and load factors shall be in accordance with the Ontario Building Code.

.3 Resistances and resistance factors shall be determined in accordance with the Ontario Building Code and CAN/CSA-S136.

.4 Stud depths are shown on the drawings. Adjust stud material thickness and spacing as required by the design criteria. Use greater or lesser stud and joist depths only if approved by the Consultant.

.5 Maximum flexural deflections under specified wind loads shall conform to the following:

.1 Wall studs supporting other finishes, L/360.

.6 Design bridging to prevent member rotation and member translation perpendicular to minor axis. Provide for secondary stress effects due to torsion between lines of bridging. Do not rely on collateral sheathing to help restrain member rotation and translation perpendicular to minor axis. Provide bridging at 1524 mm o.c. maximum. Space bridging at equal intervals over the span length of the member. Closer spacing may be required to satisfy structural requirements.

.7 Design anchorage and splice details for bridging.

.8 Design for local loading due to anchorage of cladding and interior wall mounted fixtures where shown.

1.5 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit shop drawings clearly indicating all construction details including connections and anchor requirements. Indicate type, size and spacing of fastening devices. Indicate design loads. Include seal and signature of Professional Engineer registered in the Province of Ontario for all components requiring structural design.

PART 2 - PRODUCTS

2.1 Materials

.1 Non-load bearing Steel Framing, General

.1 Steel sheet components shall comply with ASTM C645 requirements for metal, unless otherwise indicated.

.2 Steel for non-load bearing members shall have metallic coatings that conform to ASTM A653M or ASTM A792M with minimum metallic coating weights (mass) of Z120 and AZM150 respectively. Alternative coatings shall be permitted to be used if proven to have equivalent corrosion protection.

.3 Framing members shall comply with the AISI North American Standard for Cold-Formed Steel Framing (Product Data) for conditions indicated.

.2 Wind Bearing Steel Stud Framing Members and Accessories

.1 Steel shall conform to the requirements of CAN/CSA-S136 and shall be identified as to specification, grade, mechanical properties, coating type and thickness.

.2 Steel shall have metallic coatings that conform to one of the following ASTM Standards:

ASTM A653/A653M Standard Specification for Steel Sheet Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process

ASTM A792/A792M Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy Coated by the Hot-Dip Process

ASTM A1003/A1003M Standard Specification for Sheet Steel, Carbon, Metallic and Non-Metallic Coated for Cold-Formed Steel Framing Members

.3 Wind bearing steel studs shall have a minimum coating of Z180 galvanizing in accordance with ASTM-A653/A653M. Other coatings (e.g. aluminum-zinc alloy to ASTM A792/A792M) providing equal or better corrosion protection may be used.

.3 Suspension System Components

.1 Tie wire shall comply with ASTM A641/A641M zinc-coated, soft-annealed, 1.21 mm minimum diameter, or of a material and size having equivalent corrosion resistance and strength.

.2 Hanger attachments to concrete: Anchors shall be fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 2 times that imposed by construction as determined by testing by an independent testing agency according to ASTM E488.

.1 Type: Post-installed, expansion anchor

.3 Power-actuated fasteners, suitable for application indicated, shall be fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 2 times that imposed by construction as determined by testing by an independent testing agency according to ASTM E1190.

.4 Hanger wire shall comply with ASTM A641/A641M zinc-coated, soft-annealed, 3.77 mm minimum diameter, or of a material and size having equivalent corrosion resistance and strength.

.5 Carrying Channels

.1 Channels shall conform to ASTM C754 and shall be cold-firmed from steel with minimum 228 MPa yield strength and 1.37 mm base steel thickness.

.2 Channels shall have a minimum coating of Z120 galvanizing in accordance with ASTM A653/A653M. Other coatings (eg. Aluminum-zinc alloy to ASTM A792/A792M) providing equal or better corrosion protection may also be used.

.3 Carrying channels shall have minimum 12.7 mm wide flanges and minimum depth of 38 mm.

.6 Furring Members

.1 Furring channels shall comply with the AISI North American Standard for Cold-Formed Steel Framing (Product Data) and shall have a minimum base steel thickness of 0.455 mm and with minimum 12.7 mm wide flanges and a depth of 19.1 mm.

.2 Steel stud shall be manufactured from steel in accordance with the AISI North America Standard for Cold-Formed Steel Framing (Product Data) and shall have a minimum base Steel thickness of 0.455 mm and depth as indicated on drawings.

.3 Hat-shaped, rigid furring channels shall comply with the AISI North American Standard for Cold-Formed Steel Framing (Product Data) and shall have a minimum base steel thickness of 0.455 mm and minimum depth of 22.2 mm. The minimum width of furring attachment flanges shall be 12.7 mm.

.4 Resilient furring channels are designed to reduce sounds transmission and shall have a minimum depth of 12.7 mm.

.7 Steel Framing for Framed Assemblies

.1 Steel studs and track shall be in accordance with the AISI North American Standard for Cold-Formed Steel Framing (Product Data) and shall have minimum base steel thickness of 0.455 mm and a depth as indicated on drawings.

.2 Slip-Type Head Joints: Where indicated, provide one of the following:

.1 Deflection Track: steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and width to accommodate depth of studs.

.2 Single Long-Leg Track: track complying with the AISI North American Standard for Cold-Formed Steel Framing (Product Data) with 50.8 mm deep flanges in thickness not less than indicated for studs, installed with studs frication-fit into top track and with continuous bridging located within 305 mm of the top studs to provide lateral bracing.

.3 Double-Track System: track complying with AISI North American Standard for Cold-Formed Steel Framing (Product Data), inside track with 50.8 mm deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction fit inside track.

.3 Flat Strap and Backing Plate

.1 Sheet steel for blocking and bracing in length and width indicated.

.2 Minimum base steel thickness is 0.455 mm.

.4 Channel bridging shall comply with the AISI North American Standard for Cold-Formed Steel Framing (Product Data) and shall have a minimum base steel thickness of 0.455 mm with minimum 12.7 mm wide flanges and depth of 19.1 mm.

.5 Hat-shaped, rigid furring channels shall comply with the AISI North American Standard for Cold-Formed Steel Framing (Product Data) and shall have minimum base steel thickness of 0.455 mm, a minimum depth of 22.2 mm. The minimum width of furring attachment flanges shall be 12.7 mm.

.6 Resilient furring channels are designed to reduce sound transmission and shall have a minimum depth 12.7 mm.

.7 Furring channels shall comply with the AISI North American Standard for Cold-Formed Steel Framing (Product Data) and shall have a minimum base steel thickness of 0.455 mm and with minimum 12.7 mm wide flanges and a depth of 19.1 mm.

.1 Furring Brackets: adjustable, corrugated-edge of steel sheet with minimum base steel thickness of 0.79 mm.

.2 Tie wire shall comply with ASTM A641/A641M zinc-coated, soft-annealed, 1.21 mm minimum diameter, or of material and size having equivalent corrosion resistance and strength.

.9 Z-shaped Furring: with slotted web or non-slotted web, face flange of 31.8 mm, wall attachment flange of 22.2 mm, and depth steel thickness of 0.455 mm, and depth required to fit insulation thickness indicated.

.10 Fasteners for Metal Framing: of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates in accordance with ASTM C1002.

.11 Isolation strip at exterior walls: provide one of the following:

.1 Asphalt-saturated organic felt: ASTM D226, Type 1 (no. 15 asphalt felt), perforated.

.2 Foam gasket: adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 3.2 mm thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 Examination

.1 Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.

.1 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Preparation

.1 Suspended Assemblies: coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangars at spacing required to support the work and that hangars will develop their full strength.

.1 Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

.2 Coordination with Sprayed Fire-Resistive Materials

.1 Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling track to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 600 mm o.c.

.2 After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 Installation, General

.1 Installation Standard: ASTM C754, except comply with framing sizes and spacing indicated.

.1 Gypsum Plaster Assemblies: also comply with requirements in ASTM C841 that apply to framing installation.

.2 Portland Cement Plaster Assemblies: also comply with requirements in ASTM C1063 that apply to framing installation.

.3 Gypsum Veneer Plaster Assemblies: also comply with requirements in ASTM C844 that apply to framing installation.

.4 Gypsum Board Assemblies: also comply with requirements in ASTM C840 that apply to framing installation.

.2 Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

.3 Install bracing at terminations in assemblies.

.4 Do not bridge building control and expansion joints with non-load bearing steel framing members. Frame both sides of joints independently.

3.4 Erection of Lateral/Wind Bearing Framing

.1 Fabrication and erection shall conform to the approved shop drawings. Modifications required to accommodate as-built conditions (other than minor dimensional changes) shall be submitted to Consultant for approval.

.2 Methods of construction may be either piece by piece (stick-built) or by fabrication into panels (panelized) either on or off site.

.3 Wind bearing studs shall be erected true and plumb within the specified tolerances. Temporary bracing shall be employed wherever necessary to withstand all loads to which the steel stud wall system may be subject during erection and subsequent construction. Temporary bracing shall be left in place as long as required for the safety and integrity of the wall system. The erector shall ensure that during erection a margin of safety consistent with the requirements if the National Building Code and CAN/CSA-S136 exists in the uncompleted structure.

.4 Erection Tolerances

.1 For the purpose of this section, camber is defined as the deviation from straightness of a member or any portion of a member with respect to its major axis, and sweep is defined as the deviation from straightness of a member or any portion of a member with respect to its minor axis.

.2 For wind bearing studs, out of plumbness shall not exceed 1/500th of the member length. Out of straightness (camber and sweep) shall not exceed 1/1000th of the member length.

.3 For track, camber shall not exceed 1/1000th of the member length.

.4 Squareness of prefabricated panels shall be not more than 3 mm out of square within the length of that panel.

.5 Studs shall seat into top and bottom tracks. The gap between the end of the stud and the web of the track shall not exceed 3.2 mm.

.6 Align adjacent or abutting members in the same plane to within ± 0.5 mm maximum.

.7 Spacing of studs shall not be more than ± 3 mm from design spacing. The cumulative error in spacing shall not exceed the requirements of the finishing materials.

.8 Align web cut-outs in stud and joists as required for the installation of the through-the-knockout style bridging and services.

.9 Make all field measurements necessary to ensure the proper fit of all members.

.10 Cutting of members may be by saw or shear. Torch cutting is not permitted.

.11 Reinforce cut-outs where the distance from the centerline of the cut-out to the end of the member is less than 300 mm. Submit the reinforcing detail to the Consultant for approval.

.12 Replace members with localized damage.

.13 Unless a closer spacing is shown on the shop drawings, anchor top and bottom tracks securely to structure at 813 mm o.c. maximum. Place one additional anchor within 102 mm of the end of each piece of track and additionally as required by the shop drawings.

.14 Install additional studs at abutting walls, openings, terminations against other materials and on each side at corners unless explicitly detailed otherwise on the shop drawings.

.15 Insulation equal to that specified shall be placed in jamb and header assemblies that will be non-accessible after their installation into the wall. Ensure that insulation is kept dry and not compressed.

.16 Handling and lifting of prefabricated panels shall not cause permanent distortion to any member or collateral material.

3.5 Installing Suspension Systems

.1 Install suspension system components in sizes and spacings indicated on drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.

.2 Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

.3 Suspended hangers from building structure as follows:

.1 Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

.1 Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

.2 Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

.1 Size supplemental suspension members and hangers to support ceiling loads Within performance limits established by referenced installation standards.

.3 Wire Hangers: secure by looping and wire tying, either directly to structure or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.

.4 Do not attach hangers to steel roof deck unless otherwise approved.

.5 Do not attach hangers to permanent mental forms. Furnish cast-in-place hanger inserts that extend through forms.

.6 Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.

.7 Do not connect or suspend steel framing from ducts, pipes, or conduit.

.4 For fire-resistance-rated assemblies, wire tie furring channels to supports.

.5 Installation Tolerances: install suspension systems that are level to within 3 mm in 3.6 m measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.6 Installing Framed Assemblies

.1 Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

.2 Install studs so flanges within framing system point in same direction.

.1 Space studs as follows:

.1 Single-layer application: 406 mm o.c., unless otherwise indicated.

.2 Multilayer application: 406 mm o.c., unless otherwise indicated.

.3 Tile backing panels: 406 mm o.c., unless otherwise indicated.

.4 Radiused locations: 150mm o.c. or as recommended by drywall manufacturer.

.3 Install track floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions of structure.

.1 Slip-Type Head Joints: where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies die to deflection of structure.

.2 Door Openings: screw vertical studs at jambs to jamb anchor clips to door frames; install track section (for cripple studs) at head and secure to jamb studs.

.1 Install two studs at each jamb, unless otherwise indicated.

.2 Install cripple studs at head adjacent to each jamb stud, with a minimum 12.7 mm clearance from jamb stud to allow for installation of control joint in finished assembly.

.3 Other Framed Openings: frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

.4 Fire-Resistance-Rated Partitions: install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

.5 Sound-Rated Partitions: install framing to comply with sound-rated assembly indicated.

.6 Fire dampers: framing at fire dampers shall comply with manufacturer requirements as necessary to fulfill UL/ULC requirements for a complete installation capable of maintaining the scheduled fire resistance rating.

.4 Direct Furring

.1 Screw to wood framing.

.2 Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or power-driven fasteners spaced 610 mm o.c.

.5 Installation Tolerance: install each framing member so fastening surfaces vary not more than 3 mm from the plane formed by faces adjacent framing.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Labour, Products, equipment and services necessary for tile Work in accordance with the Contract Documents.

1.2 REFERENCES

.1 ANSI A108/A118/A136.1, Installation of Ceramic Tile.

.2 ASTM C144, Specification for Aggregate for Masonry Mortar.

.3 CAN/CSA A3000, Cementitious Materials Compendium.

.4 TTMAC Specification Guide 09 30 00 Tile Installation Manual.

.5 TTMAC, Maintenance Guide.

1.3 SUBMITTALS

.1 Product data:

.1 Submit copies of manufacturer's Product data in accordance with Section 01 33 00 indicating:

.1 Performance criteria, compliance with appropriate reference standard, characteristics, limitations and warranties.

.2 Product transportation, storage, handling and installation requirements.

.2 Shop Drawings:

.1 Submit Shop Drawings in accordance with Section 01 33 00 indicating:

.1 Tile layout, patterns, and colour arrangement.

.2 Perimeter conditions, junctions with dissimilar materials.

.3 Setting details.

.3 Samples:

.1 Submit following sample panels in accordance with Section 01 33 00.

.1 Each colour, texture, size, and pattern of tile.

.2 Adhere tile samples to 400 x 400 x 12.5 mm thick cement board complete with selected grout colour in joints.

.4 Certificates: Submit manufacturer's certificates stating that materials supplied are in accordance with this specification.

.5 Closeout submittals: Submit recommended maintenance instructions and listing of recommended maintenance Products for incorporation into Operations and Maintenance Manuals in accordance with Section 01 78 00.

1.4 QUALITY ASSURANCE

.1 Perform Work of this Section by a company that is a member in good standing of the Terrazzo Tile and Marble Association of Canada with proven, acceptable experience on installations of similar complexity and scope.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials in adequate crates or containers with manufacturer’s name and product description clearly marked.

.2 Handle and store tiles in a manner to avoid chipping, breakage or the instruction of foreign matter. Take precautions to protect the mortar and grout admixtures from freezing or from excessive heat.

1.6 SITE CONDITIONS

.1 Do not install Work of this Section outside of the following environmental ranges without the Consultant's and Product manufacturer's written acceptance:

.1 Ambient air and surface temperature: 15^0C to 45^0C.

.2 Precipitation: None.

.2 Install temporary protection and facilities to maintain the Product manufacturer's, and specified, environmental requirements for 7 Days before, during, and 7 Days after installation.

1.7 MAINTENANCE

.1 Submit extra tile amounting to 3% of gross area covered, allowing proportionately for each pattern and type specified and which are part of the same Production run as installed Products. Store maintenance Products as directed by the Consultant.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 General: All materials under Work of this Section, including but not limited to, primers, and sealers are to have low VOC content limits.

.2 Ceramic Wall Tile CER

.1 Urban Max, as distributed by Centura Tile. Size: 150mm x 610mm (6” x 24”). Colour: allow for 2 (two) colours selected from full colour range.

.2 Alternatives as per 01 25 00.

.3 Floor Tile POR

.1 Shadestone Series, distributed by Olympia Tile, through full body porcelain tile. Size: 300mm x 600mm (12”x24”). Colour: allow for 1 (one) colour selected from full colour range.

2. Alternatives as per 01 25 00.

.4 Thresholds: Stainless steel rounded edge at full width of door openings, at junction of tile and carpet and resilient floor materials. Acceptable product: Schluter REO-TK, Stainless Steel Round Edge Trim by Haogin or Pronivo C by Custom Building Products.

.5 Wall edge trim: L-shaped profile with 1/8" (3.2) wide top section and vertical wall section that together form the visible surface, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer. Material: Brushed stainless steel Type 304. Acceptable product: Schluter SCHIENE.

.6 Coved profile at Floor to Wall junction: roll-formed stainless steel profile with integrated trapezoid-perforated anchoring legs, connected at a 90-degree angle by a cove shaped section with 23/32" (18.5 mm) radius that forms the visible surface. Provide matching inside and outside corners. Material: Stainless Steel Type 316. Acceptable product: Schluter DILEX-EHK.

2.2 ACCESSORIES

.1 Cement: CAN/CSA A3000, Type 10.

.2 Sand: ASTM C144.

.3 Water: Potable and free of minerals and other contaminants which are detrimental to mortar and grout mixes.

.4 Mortar

.1 Ceramic Wall Tile: Latex-Portland cement mortar to ANSI A118.4.

.2 Porcelain Floor Tile: as per Section 2.3.

.5 Not used

.6 Primer: To meet specified requirements of adhesive manufacturer.

.7 Cleaner: To conform to #1000 Series of Terrazzo, Tile and Marble Association of Canada.

.8 Grout:

.1 Ceramic wall tile (below 3 mm joint width): polymer modified, unsanded Latex-Portland cement grout to ANSI A118.6. Colour to be selected by Consultant.

.2 Porcelain floor tile (3mm joint width): polymer modified sanded Latex-Portland cement grout to ANSI A118.6. Colour to be selected by Consultant.

.10 Joint backing: Round, closed cell, foam rod, oversized by 30% to 50%, Shore A hardness of 20, tensile strength 140 to 200 kPa.

.11 Sealer: Oil and grease resistant, to meet specified requirements of #3000 Series of Terrazzo, Tile and Marble Association of Canada.

.12 Tile sealant: In accordance with Section 07 92 00.

2.3 MIXES

.1 Levelling bed mix:

.1 1 part Portland cement.

.2 4 parts sand.

.3 part water (including polymer additive), adjusted for water content of sand.

.4 1/10 part polymer additive.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

.1 Clean and dry surfaces thoroughly. Remove oil, wax, grease, dust, dirt, paint, tar, primers, form release agents, curing compound, and other foreign material from substrate surfaces which may prevent or reduce adhesion.

.2 Neutralize any trace of strong acids or alkali from the substrate.

.3 Contractor is responsible for shot-blasting/grinding existing concrete slab as required to make it suitable for new tile installation.

.4 Prepare concrete slab for installation of new floor tile in accordance with TTMAC requirements/Detail 311F-2009/2101.

3.2 CONTROL JOINTS

.1 Continue control, construction, and cold joints in the structural substrate up through the tile finish, and align with mortar joints where possible. Review joint locations on Site with the Consultant.

.2 Install joint widths to match grout joint widths, except where a minimum width is indicated.

.3 Install control joints in the following typical locations:

.1 Aligned over changes in type of substrate.

.2 At the restraining perimeters such as walls and columns.

.3 Interior areas (not subject to sunlight): 6 mm minimum width, at 7320 mm o.c. maximum.

.4 Interior areas (subject to sunlight): 6 mm minimum width, at 3660 mm o.c maximum.

.5 As indicated on Drawings.

.4 Seal control joints in accordance with Section 07 92 00.

3.3 LEVELLING BED

.1 Install a levelling bed on uneven substrate surfaces if required, level and plumb substrates in accordance with the following tolerances:

.1 Vertical surfaces: 3 mm in 2.4 m maximum.

.2 Horizontal surfaces: 6 mm in 3 m from finished levels of the surface, or better.

.2 Clean structural substrate control joints and blow-clean with compressed air. Grout fill control joints flush to slab with levelling bed.

3.4 GENERAL INSTALLATION REQUIREMENTS

.1 Install tiles in accordance with manufacturer's instructions and TTMAC Specification Guide 09300 Tile Installation Manual. Manufacturer's installation instructions govern over TTMAC Installation Manual.

.2 Lay out Work to produce a symmetrical pattern with minimum amount of cutting. Ensure cut tile at room perimeter is not less than ½ full size.

.3 Install trim to be placed under tile in locations indicated on Drawings.

.4 Apply exterior grade mortar bed to substrate with flat trowel and press firmly into surface, apply additional mortar using notched trowel.

.5 Set tiles in place and rap or beat with a beating block as necessary to ensure a proper bond and to level surface. Align tile for uniform joints and allow to set until firm. Clean excess mortar from surface of tile with a wet cloth or sponge while mortar is fresh.

.6 Adjust joints between units uniform, plumb, straight, even, and true, with adjacent tile flush. Align grout joints in both directions unless indicated otherwise.

.7 Align floor, base and wall grout joints.

.8 Install tile accessory fittings for a complete and fully coordinated tile assembly.

.9 Install wall tile full height unless indicated otherwise.

.10 Cut and fit tile neatly around piping, fittings, projections and around recesses items e.g. washroom accessories. Where surface mounted equipment and accessories are installed on tile surfaces, extend tile over surfaces. Cut edges smooth, even, and free from chipping; chipped and broken edges are not acceptable.

.11 Do not proceed with grouting until minimum 48 hours after tile has set, to prevent displacement of tiles.

.12 Apply grout in accordance with grout manufacturer's directions to produce watertight, filled joints without voids, cracks and excess grout. Thoroughly compact and tool floor grout. Finish grout flush to edge thickness of tile and remove excess grout with soft burlap or sponge moistened with clean water.

3.5 CLEANING

.1 Clean off excess grout with soft burlap or sponge moistened with clean water.

.2 Polish floor and wall tile after grout has cured in accordance with TTMAC recommendations in the Maintenance Guide; do not use acid for cleaning.

.3 Re-point joints after cleaning as required to eliminate imperfections, then re-clean as necessary. Avoid scratching tile surfaces.

3.6 JOINT BACKING AND TILE SEALANT

.1 Install joint backing under sealant as necessary.

.2 Install tile sealant around piping and fittings extending through tiled surfaces.

.3 Seal tile control joints.

.4 Seal internal tile to tile junctions. Tool to a smooth, flush surface, free from air bubbles and contamination.

3.7 PROTECTION

.1 Prevent traffic over tiled areas, and protect tiled assemblies from weather, freezing, and water immersion, for 72 hours minimum, after final installation.

.2 Prevent direct impact, vibration and heavy hammering on adjacent and opposite walls for 24 hours minimum, after final installation.

.3 Cover Work temporarily with building paper properly lapped and taped at joints until Work has been approved by Consultant.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Drawings and general conditions of Contract, including General and Supplementary Conditions and Divisions-1 Specification sections apply to work of this section

1.2 SUMMARY

.1 Section Includes

.1 Acoustical ceiling panels

.2 Exposed gird suspension system

.3 Wire hangers, fasteners, main runners, cross tees, and wall angle moldings

.4 Perimeter Trim

.2 Equivalent Products

.1 As per Section 01 25 00 – Alternatives.

.2 Submittals that do not provide adequate data for the product evaluation will not be considered. The proposed substitution must meet all requirements of this section, including but not necessarily limited to, the following: Single source materials suppliers (if specified in Section 1.5); Underwriters' Laboratories Classified Acoustical performance; Panel design, size, composition, color, and finish; Suspension system component profiles and sizes; Compliance with the referenced standards.

1.3 REFERENCES

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

.1 ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability

.2 ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

.3 ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process

.4 ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

.5 ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings

.6 ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels

.7 ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber

.8 ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials

.9 ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Material

A. Armstrong Fire Guard Products

.10 ASTM E 580 Installation of Metal Suspension Systems in Areas Requiring Moderate Seismic Restraint

.11 ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems

.12 ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum

.13 ASTM E 1264 Classification for Acoustical Ceiling Products

.2 ASHRAE Standard 62.1-2004, Ventilation for Acceptable Indoor Air Quality

.3 Ontario Electrical Safety Code

.4 ASCE 7 American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures

1.4 SYSTEM DESCRIPTION

Continuous/Wall-to-Wall

1.5 SUBMITTALS

.1 Product data:

.1 Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.

.2 Shop Drawings:

.1 Shop Drawings: Layout and details of acoustical ceilings. Show locations of items which are to be coordinated with, or supported by the ceilings.

.3 Samples:

.1 Submit following sample panels in accordance with Section 01 33 00.

.1 Minimum 6 inch x 6 inch samples of specified acoustical panel

.2 8 inch long samples of exposed wall molding and suspension system, including main runner and 4 foot cross tees

.4 Certificates: 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 If the material supplied by the acoustical subcontractor does not have an Underwriter's Laboratory classification of acoustical performance on every carton, subcontractor shall be required to send material from every production run appearing on the job to an independent or NVLAP approved laboratory for testing, at the architect's or owner's discretion. All products not conforming to manufacturer's current published values must be removed, disposed of and replaced with complying product at the expense of the Contractor performing the work.

.5 Closeout submittals: Submit recommended maintenance instructions and listing of recommended maintenance Products for incorporation into Operations and Maintenance Manuals in accordance with Section 01 78 00.

1.6 QUALITY ASSURANCE

.1 Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

.1 Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.

.2 Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 Classification.

.3 Fire Resistance: As follows tested per ASTM E119 and listed in the appropriate floor or roof design in the Underwriters Laboratories Fire Resistance Directory

.2 Acoustical Panels: As with other architectural features located at the ceiling, may obstruct or skew the planned fire sprinkler water distribution pattern through possibly delay or accelerate the activation of the sprinkler or fire detection systems by channeling heat from a fire either toward or away from the device. Designers and installers are advised to consult a fire protection engineer,

NFPA 13, or their local codes for guidance where automatic fire detection and suppression systems are present.

.3 Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.7 DELIVERY, STORAGE AND HANDLING

.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.

.2 Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

.3 Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.8 SITE CONDITIONS

.1 Standard Ceilings: Do not install interior ceilings until space is enclosed and weatherproof; wet work in place is completed and nominally dry; work above ceilings is complete; and ambient conditions of temperature and humidity are continuously maintained at values near those intended for final occupancy. Building areas to receive ceilings shall be free of construction dust and debris.

.2 HumiGuard Plus Ceilings: Building areas to receive ceilings shall be free of construction dust and debris. Products with HumiGuard Plus performance and hot dipped galvanized steel, aluminum or stainless steel suspension systems can be installed up to 120°F (49°C) and in spaces before the building is enclosed, where HVAC systems are cycled or not operating. Cannot be used in exterior applications where standing water is present or where moisture will come in direct contact with the ceiling.

.3 HumiGuard Max Ceilings: Building areas to receive ceilings shall be free of construction dust and debris. Ceilings with HumiGuard Max performance can be installed in conditions up to 120°F (49°C) and maximum humidity exposure including outdoor applications, and other standing water applications, so long as they are installed with either SS Prelude Plus, AL Prelude Plus, or Prelude Plus Fire Guard XL suspension systems. Products with Humiguard Max performance can be installed in exterior applications, where standing water is present, or where moisture will come in direct contact with the ceiling. Only Ceramaguard with AL Prelude Plus suspension system can be installed over swimming pools.

1.9 WARRANTY

.1 Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to the following

.1 Acoustical Panels: Sagging and warping

.2 Grid System: Rusting and manufacturer's defects

.2 Warranty Period

.1 Acoustical panels: Ten (10) years from date of substantial completion

.2 Suspension: Ten (10) years from date of substantial completion

.3 Ceiling System: Thirty (30) years from date of substantial completion

.3 The Warranty 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.

1.10 MAINTENANCE

.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.

.1 Acoustical Ceiling Units: Furnish quality of full-size units equal to 5.0 percent of amount installed, for each ceiling type/pattern.

.2 Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed, for each ceiling type/pattern.

APRT 2 - PRODUCTS

2.1 MANUFACTURERS

.1 Acceptable Manufacturer for Acoustical Ceiling (ACT/ACT2): Armstrong World Industries. The following manufacturers may be submitted for evaluation by the architect by following the conditions of the Alternatives Section 01 25 00. The architect shall be the sole judge as to the acceptability of all products submitted for substitution.

.1 CertainTeed.

.2 Canadian Gypsum Company (CGC).

2.2. ACOUSTICAL CEILING TYPE 1 (ACT1)

.1 Surface Texture: Smooth

.2 Composition: Fiberglass

.3 Color: White

.4 Size: 610mm x 1220mm x 25mm (24in x 24in x 1in)

.5 Edge Profile: Square

.6 Noise Reduction Coefficient (NRC): ASTM C 423; Classified with UL label on product carton .90

.7 Articulation Class (AC): ASTM E 1111; Classified with UL label on product carton 190

.8 Flame Spread: ASTM E 1264; Class A (UL)

.9 Light Reflectance (LR) White Panel: ASTM E 1477; 0.88

.10 Dimensional Stability: HumiGuard Plus

.11 Material Ingredient Transparency: Health Product Declaration (HPD); Declare Label

.12 Life Cycle Assessment: Third Party Certified Environment Product Declaration (EPD)

.13 Acceptable Product: Optima, 3353 as manufactured by Armstrong World Industries, or equivalent

2.3 ACOUSTICAL CEILING ACT3 (ACT2)

.1 As above, sizes:

.2 1219mm x 2440mm x 25mm (48in x 96in x 1in); Optima, 3154 as manufactured by Armstrong World Industries, or equivalent

2.4 SUSPENSION SYSTEM AT ACOUSTICAL CEILING

.1 Components: Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees are double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.

.1 Structural Classification: ASTM C 635 Intermediate Duty

.2 Color: White Aluminum and match the actual color of the selected ceiling tile, unless noted otherwise.

.3 Acceptable Product: Prelude XL 15/16" Exposed Tee as manufactured by Armstrong World Industries, Inc.

.2 Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

.3 Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft annealed, with a yield stress load of at least time three design load, but not less than 12 gauge.

.4 Edge Moldings and Trim: 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.

.5 Accessories

.1 Shadow molding with ½" (13mm) reveal, exposed flange same width as exposed runners, to be used at interface with walls/bulkheads.

.2 Additional edge trim as detailed/scheduled.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 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 manufacturer's printed recommendations. (Exception: HumiGuard Max Ceilings)

.2 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 Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.

.1 Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.2 PREPARATION

.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.

.2 Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.

.1 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

.1 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.

.2 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 Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.

.4 For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.

.5 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.

3.4 INTERFACE WITH OTHER WORK

.1 Co-ordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, sprinkler heads, to be built into acoustical ceiling components.

3.5 ADJUSTING AND CLEANING

.1 Replace damaged and broken panels.

.2 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.

.1 Ceiling Touch-Up Paint, (Item #5760, 8oz. bottles) (Item #5761, quart size cans), "global white" latex paint should be used to hide minor scratches and nicks in the surface and to cover field tegularized edges that are exposed to view.

.3 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 RELATED DOCUMENTS

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

.1 Section Includes:

.1 Non-perforated felt ceiling panels

.2 Suspension systems

.3 Accessories; provide other necessary items including devices for attachment overhead construction, secondary members, splines, splices, connecting clips, wall connectors, wall angles, and other devices required for a complete installation.

.4 Supplemental support framing: Provide fully engineered secondary framing as required to meet code, conforming to layout shown in drawings, to support direct-hung felt ceilings suspension system.

.2 This Section covers the general requirements only for Acoustical Felt Ceilings as shown on the drawings. The supplying and installation of additional accessory features and other items not specifically mentioned herein, but which are necessary to make a complete installation, shall also be included or clarified accordingly.

1.3 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 E 84 – "Standard Test Method for Surface Burning Characteristics of Building Materials"

.2 E 488 – "Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements"

.3 B 209 – "Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate"

.4 C 423 – "Sound Absorption and Sound Absorption Coefficients by Reverberation Room Method"

.5 E 580 – "Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Moderate Seismic Restraint"

.6 C 635 – "Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings"

.7 C 636 – "Recommended Practice for Installation of Metal Ceiling Suspensions Systems for Acoustical and Lay-in Panels"

.8 A 641 – "Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire"

.9 A 653 – "Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip process"

.10 E 1264 – "Classification for Acoustical Ceiling Products"

.11 E 1477 – "Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by use of Integrating-Sphere Reflectometers"

.12 D 1044 – "Practice for Abrasion Resistance"

.13 D 1002 – "Practice for Adhesion Resistance"

.2 Cradle-to-Cradle Bronze Certified

1.4 SUBMITTALS

.1 Product Data: Manufacturer's detailed installation instructions and maintenance data.

.2 Product Certification: Manufacturer's certifications that products comply with specified requirements and governing codes including product data, laboratory test reports and research reports showing compliance with specified standards.

.3 Test Reports: Certified reports from independent agency substantiating structural compliance to governing code requirements.

.4 Certificates:

.1 Certified data attesting fire rated materials comply with specifications.

.5 Shop Drawings: Submit shop drawings for reflected ceiling plans (RCP's), drawn to scale, and indicating penetrations and ceiling mounted items. Show the following details:

.1 Reflected Ceiling Plan(s): Indicating felt ceiling layout, ceiling mounted items and penetrations.

.2 Suspension System, Carrier and Component Layout.

.3 Details of system assembly and connections to building components.

.6 Samples for Verification: Full-size units (or as specified below) of each type of ceiling assembly indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics. Submit samples for each type specified.

.1 11" long felt panel units.

.2 11" long samples of each suspension component.

1.5 QUALITY ASSURANCE

.1 Manufacturer/Installer Qualifications:

.1 Provide felt ceiling system and suspension system components produced by a single manufacturer to provide consistent quality in appearance and physical properties, without delaying the work.

.2 Perform installations using a firm with installers having no less than 3 years of successful experience on projects of similar size and requirements.

.2 Regulatory Requirements:

.1 Fire Rating Performance Characteristics: Install system to provide a flame spread of 0 - 25, complying with certified testing to ASTM E 84.

.2 Installation Standard for Suspension System: Comply with ASTM C 636.

.3 Pre-installation Conference: Conduct a conference, prior to start of installation, to review system requirements, shop drawings, and all coordination needs. Pre-installation conference to be coordinated to coincide with regularly scheduled, bi-weekly site meeting.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver system components in manufacturer's original unopened packages, clearly labeled.

.2 Store components in fully enclosed dry space. Carefully place on skids, to prevent damage from moisture and other construction activities.

.3 Handle components to prevent damage to surfaces and edges, and to prevent distortion and other physical damage.

1.7 PROJECT CONDITIONS

.1 Begin system installations only after spaces are enclosed and weather-tight, and after all wet work and overhead work have been completed.

.2 Prior to starting installations, allow materials to reach ambient room temperature and humidity intended to be maintained for occupancy.

1.8 WARRANTY

.1 Provide specified manufacturer's warranty against defects in workmanship, discoloration, or other defect considered undesirable by the Architect or Employer.

.2 This warranty shall remain in effect for a minimum period of one (1) year from date of Substantial Performance.

1.9 MAINTENANCE & EXTRA MATERIALS

.1 Maintenance Instructions: Provide manufacturer's standard maintenance and cleaning instructions for finishes provided.

.2 Extra Materials: Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents. Only typical system components are included with attic stock.

.1 Acoustical Felt Ceiling Pan Units: Full-size units equal to two percent (2%) of amount installed.

.2 Ceiling Suspension System Components: Quantity of each grid and exposed component equal to two percent (2%) of amount installed.

PART 2 PRODUCTS

2.1 MANUFACTURER

.1 HeartFelt™ linear felt panel ceiling system manufactured by Hunter Douglas and distributed by CertainTeed

.2 Equivalent products as per Specification 01 25 00.

2.2 SYSTEM MATERIALS

.1 Linear felt panel ceiling system for interior installations:

.2 Panel Profile Type: .090" thick PES (polyester) felt with square edges; 1-9/16" wide, 2-3/16" deep with open reveal to form a 2-3/8"module.

.2 Panel length: 8'-0” (2440mm)

.3 Linear Suspension System:

.1 Carrier: Roll-formed aluminum section with hook-shaped tabs spaced to receive ceiling panels. All tabs at the same height for Ceiling panel to remain on same plain. Finish: black.

.4 Hangers:

.1 Hanger Wire: 12 gage galvanized carbon steel hanger wire.

.2 Threaded Rod

.3 Aircraft Cable

.5 Wall Trims:

.1 60mm carrier track.

.2 HL55 perimeter J-Trim, depth to suit felt profile.

.6 Panel Finish:

Colour: allow for 3 colours to be selected by Consultant from standard colour range.

2.3 ACCESSORY MATERIALS

.1 Panel Splice: Formed aluminum insert designed to slide into and bite into ends of two ceiling panels.

PART 3- EXECUTION

3.1 EXAMINATION

.1 Examine substrates and structural framing to which acoustical felt panels attach or abut, with installer present, for compliance with requirements specified in this and other Sections that affect installation and anchorage, and other conditions affecting performance of felt panel ceilings.

.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.

.2 Measure each ceiling area and establish layout of acoustical felt pan units to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width units at borders, and comply with layout shown on reflected ceiling plans.

.3 Survey substrate for wall attachment to assure squareness and proper elevation for wall panel installation.

3.3 INSTALLATION

.1 General: Install acoustical felt pan ceilings, per manufacturers shop drawings provided, per manufacturer's written instructions and to comply with publications referenced below.

.1 CISCA "Ceiling Systems Handbook"

.2 Standard for Ceiling Suspension System Installations - ASTM C 636

.3 Standard for Ceiling Suspension Systems Requiring Seismic Restraint - ASTM E 580

.2 Suspend ceiling hangers from building's approved structural substrates and as follows:

.1 Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.

.2 Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.

.3 Where width of ducts and other construction within ceiling plenum produce hanger spacings that interfere with location of hangers at spacing required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Utilize supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

.4 Where used secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

.5 Space hangers not more than 48" on-center, along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 12" from ends of each member. Supply supporting calculations from licensed Structural Engineer verifying hanger spacing meets all requirements, when spacing exceeds those recommended.

.6 Level grid to 1/8" in 10' from specified elevation(s), square and true.

.7 Adjust suspension system runners so they are square (within .5 degree from 90 degrees) and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

.3 Secure bracing wires to ceiling suspension members and to supports acceptable to Architect/Engineer and/or inspector. Suspend bracing from building's structural members and/or structural deck, as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs (unless directed otherwise).

.4 Scribe and cut acoustical felt panel units for accurate fit at penetrations by other work through ceilings. Stiffen edges of cut units as required to eliminate evidence of buckling or variations in flatness exceeding referenced standards for stretcher-leveled felt sheet.

.5 Install acoustical felt panel units in coordination with suspension system. Fit adjoining units to form flush, tight joints. Scribe and cut units for accurate fit at borders and around construction penetrating ceiling.

3.4 ADJUST AND CLEAN

.1 Adjust components to provide uniform tolerances.

.2 Replace all ceiling panels that are creased, faded, or otherwise damaged.

.3 Clean exposed surfaces with vacuum or dusting. If necessary, panels can be wet cleaned with water, or non-solvent, non-abrasive commercial type cleaner.

END OF SECTION

PART 1 - GENERAL

1.1 Work Included

.1 Comply with Division 1, General Requirements and all documents referred to therein.

.2 Provide all labour, materials, products, equipment and services to complete resilient flooring required and/or indicated on the Drawings and specified herein.

1.1 References

.1 American Society for Testing and Materials (ASTM)

.1 ASTM F 1303-95, Specification for Sheet Vinyl Floor Covering with Backing.

.2 Canadian Standards Association (CSA)

.1 ASTM E 648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source

.2 ASTM E 662 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials

.3 ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

.4 ASTM F 1482, Standard Guide to Wood Underlayment Products Available for Use Under Resilient Flooring

.5 ASTM F 1700 Standard Specification for Solid Vinyl Tile

.6 ASTM F 1861 Standard Specification for Resilient Wall Base

.7 ASTM F 1869 Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride

.8 ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

1.2 Submittals

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

.2 Submit duplicate 300 x 300 mm sample pieces of sheet material, 300 mm long.

1.3 Closeout Submittals

1 Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.4 Extra Materials

.1 Provide extra materials of resilient sheet flooring and adhesives in accordance with Section 01 78 00 - Closeout Submittals.

.2 Provide 2% of each colour, pattern and type flooring material required for project for maintenance use. Provide one 3600mm length of each type and colour of resilient base.

.3 Extra materials to be in one piece and from same production run as installed materials.

.4 Clearly identify each roll of sheet flooring and each container of adhesive.

.5 Deliver to Client, upon completion of the work of this section.

.6 Store where directed by Client.

1.5 Environmental Requirements

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

1.08 LIMITED WARRANTY

.1 Resilient Flooring: Submit a written warranty executed by the manufacturer, agreeing to repair or replace resilient flooring that fails within the warranty period.

.2 Limited Warranty Period:

.1 RES: 15 years.

.2 RES2: 10 years.

.3 The Limited 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.

PART 2 - PRODUCTS

2.1 Materials

1 Resilient flooring must:

.1 meet or exceed all applicable governmental and industrial safety and performance standards; and

.2 be manufactured and transported in such a manner that all steps of the process, including the disposal of waste products arising there from, will meet the requirements of all applicable governmental acts, by laws and regulations including, for facilities located in Canada, the Fisheries Act and the Canadian Environmental Protection Act (CEPA).

.2 **Resilient Flooring (RES)**

.1 Manufacturer/Product: ShawContract, Surface and Strand Collection; or equivalent per Specification 01 25 00..

.2 Description: A layered construction consisting of a tough, clear, rigid vinyl wear layer protecting a high-fidelity print layer on a solid vinyl backing. Protected by a diamond-infused UV-cured polyurethane finish, the wear surface is embossed with different textures to enhance each of the printed visuals. Colors are insoluble in water and resistant to cleaning agents and light.

.2 Reference specification - ASTM F 1700, “Standard Specification for Solid Vinyl Tile", Class III, Type B. Meets requirements for size, squareness, thickness, thickness of wear layer, residual indentation, resistance to chemicals, resistance to light and resistance to heat.

.3 Pattern and Color: to be selected by Consultant from manufacturers full colour range. Allow for 4 colours.

.4 Size: 18 in. x 36 in. (457.2 mm x 914.4 mm).

.5 Wear layer thickness: 0.020 (0.5 mm)

.6 Thickness: 0.100 in. (2.5 mm)

.3 **Resilient Flooring (RES 2)**

.1 Manufacturer/Product: Sport Impact by Mondi; or equivalent per Specification 01 25 00.

.2 A prefabricated resilient athletic flooring, calendered and vulcanized, with a base of natural and synthetic rubbers, stabilizing agents and pigmentation.

.3 Dual durometer construction, vulcanized into a single prefabricated sheet/tile for optimal performance and durability. The Shore hardness of the top layer (wear layer) will be greater than that of the bottom layer (backing); Shore hardness of layers to be recommended by the Manufacturer and to respect limits specified.

.4 Health-Conscious Production: free from red listed ingredients (LBC Red List) and is manufactured without bisphenol A (BPA), formaldehyde, halogens, heavy metals, isocyanates, phthalates and polyvinyl chloride (PVC).

.5 Thickness: 0.236'' (6 mm).

.6 Colors: Provided in standard, solid background colors with randomly dispersed colored chips throughout the wear layer's entire depth. Final colour selection to be provided by Consultant from manufacturers full colour range (1 colour).

.7 Surface Texture: Sealskin.

.8 Formats: 36" x 36" (91.35 cm x 91.35 cm) tiles.

.4 Tactile Walking Surface Indicator Tile (TWIS)

.1 Flexible Polymer TWSI tiles shall be a double loaded, unglazed full body Flexible Polymer tile. Tiles consist of field tiles and tactile walking surface indicator (TWSI) domes or bars.

.2 The tile shall incorporate an in-line pattern of truncated domes measuring nominal 4mm height, 23mm base diameter, 12mm top diameter spaced center-to-center 60mm as measured on a diagonal and 42mm as measured side by side. For wheelchair safety the field area shall consist of a non-slip surface with a minimum of 40 - 90° raised points 1.2mm high, per square inch.

.3 Manufacturer/Product: Eon Tile as manufactured by Kinesik; or equivalent per Specification 01 25 00.

.1 Colour: to be selected by Consultant from standard colour range

.5 Rubber Stair Treads without Integrated Riser: to be manufactured from a homogeneous composition of 100% synthetic rubber, high quality additives, and colorants to meet the performance requirements of ASTM F-2169 Standard Specification for Resilient Stair Treads, Type TS, Class 1 and 2, Group 1 and 2.

.1 Provide a 2" (5.08 cm) wide strip of contrasting color grit tape at stair nosing.

.2 Length: full width of stair tread or as detailed.

.3 Colour: To be determined by Consultant from full colour range. Allow for 2 colours.

.4 Texture: To be determined by Consultant from full texture range.

.5 Acceptable Products: Johnsonite Stairwell System, rubber stair treads by Mannington Commercial or Roppe

.6 Rubber Wall Base:

.1 100% PVC free, continuous, top set, complete with premoulded end stops and external corners:

.2 Type: thermoset rubber.

.3 Style: cove (at RES floor locations)

.4 Thickness: 3.17 mm.

.5 Height: 101.6 mm.

.6 Lengths: cut lengths minimum 2400 mm.

.7 Colour: To be determined by consultant from full colour range

.8 Acceptable products/manufacturers: Baseworks thermoset rubber Type TS by Johnsonite, Pinnacle by Roppe or equivalent.

.7 In the selection of resilient tile or sheet flooring and related coatings, adhesives, solvents, cleaners, and other fluids, select those with the following characteristics: zero VOC, manufactured without compounds which contribute to ozone depletion in the upper atmosphere, manufactured without compounds which contribute to smog in the lower atmosphere, does not contain methylene chloride, does not contain chlorinated hydrocarbons, recycled content and be recyclable.

.8 Primers and adhesives of types recommended by resilient flooring manufacturer for specific material on applicable substrate, above, on or below grade.

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

.10 Sealer and wax: type recommended by resilient flooring material manufacturer for material type and location.

.11 For edging between resilient sheet flooring and all other floor materials always use a flush anodized aluminum metal edging similar to Schluter Schiene. Exact model number to be determined by the contractor based on site conditions and height differential and to be approved by architect prior to installation.

PART 3 - EXECUTION

3.1 Site Verification of Conditions

.1 Ensure concrete floors are clean and dry by using test methods recommended by flooring manufacturer.

3.2 Preparation

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

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

.3 Surface Preparation:

.1 General: Prepare floor substrate in accordance with manufacturer's instructions.

.2 Floor Substrate: Floors shall be sound, smooth, flat, permanently dry, clean, and free of all foreign materials including, but not limited to, dust, paint, grease, oils, solvents, curing and hardening compounds, sealers, asphalt and old adhesive residue.

.3 Concrete Floor Substrate: Concrete floor substrate shall have a minimum compressive strength of 3,000 psi. Refer to Division 3 Concrete sections for patching and repairing crack materials, and leveling compounds with portland cement based compounds.

.1 Reference Standard: Comply with ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

.4 Concrete Moisture Testing: Conduct moisture tests on <u>all</u> concrete floors regardless of the age, grade level or the presence of existing flooring. Conduct calcium chloride tests in accordance with ASTM F 1869. Measure the internal relative humidity of the concrete slab in accordance with ASTM F 2170. One test of each type should be conducted for every 1,000 square feet of flooring (minimum of 3). The tests should be conducted around the perimeter of the room, at columns, and anywhere moisture may be evident. Concrete moisture vapor emissions must not exceed 8.0 lbs. per 1,000 square feet in 24 hours when using Forbo L 885 adhesive. Concrete internal relative humidity must not exceed 85% when using Forbo L 885 adhesive. A diagram of the area showing the location and results of each test should be submitted to the Architect, General Contractor or End User. If the test results exceed these limitations, the installation must not proceed until the problem has been corrected.

.7 Concrete pH Test: Perform pH tests on concrete floors regardless of the age or grade level. If the pH is greater than 11, it must be neutralized prior to beginning the installation.

3.3 Installation: Resilient Flooring RES

.1 Install flooring in strict accordance with the latest edition of flooring manufacturers written installation manual.

.2 Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.

.3 If required, install flooring on pan-type floor access covers. Maintain continuity of color and pattern within pieces of flooring installed on these covers. Adhere flooring to the subfloor around covers and to covers.

.4 Scribe, cut, and fit to permanent fixtures, columns, walls, partitions, pipes, outlets, and built-in furniture and cabinets.

.5 Roll with a 100-pound (45.36 kilogram) roller in the field areas. Refer to specific rolling instructions of the flooring manufacturer.

.6 Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.

3.4 Installation: Resilient Flooring RES 2

.1 Install tiles of resilient athletic flooring following Manufacturer’s current printed guidelines.

.2 Install all accessories following Manufacturer’s current printed guidelines.

3.5 Installation: Base

.1 Ensure substrate/background meets the requirements of ASTM F1861 and Manufacturer Installation Instructions and Technical Data.

.2 Fill cracks, holes, depressions and irregularities in the substrate/background to prevent transferring through to the surface of the resilient wall base.

.3 Lay out base to keep number of joints at minimum.

.1 Select the appropriate adhesive for the application and job site conditions.

.2 Install material according to roll sequence or with like run numbers.

.3 Ensure material is rolled appropriately into the adhesive using a hand roller.

.4 Install straight and level to variation of 1:1000.

.5 Scribe and fit to door frames and other obstructions.

.6 Conduct initial maintenance prior to final usage per the Manufacturer Care & Maintenance Documents. Do not conduct initial maintenance until adhesive has cured per the adhesive technical data.

3.6 Cleaning

.1 Remove excess adhesive from floor, base and wall surfaces without damage.

.2 Conduct initial cleaning and maintenance, including removal of factory coatings and provision of initial seal and wax as per to flooring manufacturer's printed instructions.

3.7 Protection

.1 Protect new floors from time of final set of adhesive until final inspection.

END OF SECTION

PART 1.0 - GENERAL

1.1 References

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-4.2- [92], Textile Test Methods.

.2 CGSB 4-GP-36M- [78], Carpet Underlay, Fiber Type.

.3 CAN/CGSB-4.129- [93], Carpets for Commercial Use.

.4 CGSB 20-GP-23M- [78], Cushion, Carpet, Flexible Polymeric Material.

.5 CAN/CGSB-25.20- [95], Surface Sealer Floors.

1.2 Samples

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

.2 Submit duplicate 675 x 900 mm pieces of each carpet type specified.

.3 Include installation recommendations for each type of substrate as specified in carpet manufacturer's installation guidelines and/or Carpet & Rug Institute Installation Standard 2011, where applicable.

1.3 Closeout Submittals

.1 Submit carpet maintenance recommendations as outlined by the carpet manufacturer for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

.2 Include information on recycling of carpet including manufacturer's reprocessing program. Indicate which portions of materials are recyclable. Ensure compliance with Section 2.

1.4 Regulatory Requirements

.1 Prequalification: compliance with Department of Consumers and Corporate Affairs regulations under "Hazardous Products Act", Part II of the Schedule, tested to CAN/ULC-S102.2.

.2 Indoor Air Quality: compliance with CRI Indoor Air Quality Program, CRI -IAQ requirements for maximum total volatile chemicals released into air. Label each carpet product with CRI -IAQ label.

.3 Provide documentation that product meets or exceeds following criteria based on an emission factor measured in mg/m /hr:

.1 Total Volatile Organic Compounds - 0.5.

.2 Formaldehyde - 0.05.

.3 4-phenylcyclohexene - 0.05.

.4 Styrene - 0.4.

1.5 Delivery, Storage and Handling

.1 Label packaged materials. For tile products indicate nominal dimensions of tile.

.2 Store packaged materials in original containers or wrapping with manufacturer's seals and labels intact.

.3 Store carpeting and accessories in location as directed by Owner.

.4 Prevent damage to materials during handling and storage. Keep materials under cover and free form dampness.

.5 Maintain temperature of store room at a minimum of 20C, for at least 24 hours immediately before the installation

1.6 Waste Management and Disposal

.1 Place materials defined as hazardous or toxic waste in designated containers.

.2 Ensure emptied containers are sealed and stored safely for disposal away from children.

.3 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.4 Fold up metal banding, flatten and place in designated area for recycling.

.5 Collect and separate plastic and/or paper packaging for recycling.

.6 Use the least toxic sealants and adhesives necessary to comply with requirements of this section.

.7 Close and seal, tightly, all partly used sealant and adhesive containers and store protected in well ventilated, fire-safe area at moderate temperature.

.8 Place used hazardous sealant tubes and adhesive containers in areas designated for hazardous materials.

.9 Collect, package and store carpet cut-offs and waste material for recycling and return to recycler in accordance with Waste Management Plan.

1.7 Project/Site Environmental Requirements

.1 Moisture: Ensure substrate is within moisture limits prescribed by manufacturer.

.2 Temperature: Maintain ambient temperature of not less than [18] C from [72] hours before installation to at least 72 hours after completion of work.

.3 Relative humidity: Maintain relative humidity between 10 and 65% RH for 48 hours before, during and 48 hours after installation.

.4 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

.5 Ventilation:

.1 Ventilate area of work as directed by client by use of approved portable supply and exhaust fans.

1.8 Extra Materials

.1 Provide extra materials of carpet, carpet base, and adhesives in accordance with Section 01 78 00 - Closeout Submittals.

.2 Extra Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10.67 sq. yd. (8.9 sq. m).

.3 Extra materials to be from same production run as installed materials.

.4 Identify each package of carpet and each container of adhesive.

.5 Deliver to Owner and store where directed by Owner.

PART 2.0 - PRODUCTS

2.1 Acceptable Manufacturers/Products

.1 Carpet CPT

.1 Colour Beat as manufactured by Mohawk Group.

.2 Alternatives as per Section 01 25 13.

.3 Size: Size: 610mm x 610mm (24in x 24in)

.4 Colours

.1 Allow for two (2) field colour and two (1) accent colour, to be selected by Consultant from full manufacturer colour range.

.5 Installation Method

.1 To be selected by Consultant from manufacturer recommended installation methods prior to the time of installation.

2.2 Performance Characteristics

.1 Critical Radiant Flux Classification, Flooring Radiant Panel ASTM E 648: Not less than 0.45 W/sq. cm.

.2 Smoke Density: Less than 450 per ASTM E662.

.3 Methanamine Pill Test CPSC FF1-70: Must pass pill test.

.4 Tuft Bind: Not less than 8 lbf (36 N) according to ASTM D 1335.

.5 Delamination: Not less than 3.5 lbf/in. according to ASTM D 3936.

.6 Dimensional Tolerance: Within 1/32 inch of specified size dimensions, as determined by physical measurement.

.7 Dimensional Stability: 0.119 percent or less according to ISO 2551 (Aachen Test).

.8 Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 129 ad AATCC 164.

.9 Colorfastness to Light: Not less than 4 after 60 AFU (AATCC fading units) according to AATCC 16, Option E.

.10 Electrostatic Propensity: Less than 3.5 kV according to AATCC 134.

.11 Emissions: Provide carpet tile that complies with testing and product requirements of Carpet & Rug Institute's "Green Label Plus" program.

2.3 Accessories

.1 Rubber Wall Base:

.1 Rubber thermoplastic wall base to ASTM F1861 consisting of a blend of a thermoplastic and rubber backing covered with a durable colored top layer

.2 Dimensions: 107.95mm high x 9.53mm thick x 2440mm lengths

.3 Surface burning: Class A per ASTM E84/NFPA 253, FSR 50/SDS 175 per CAN/ULC-S102.2

.4 Acceptable product:

.1 Contours, PV4060 by Roppe

.2 Equivalent per 01 25 00

.5 Colour: To be selected by Consultant from manufacturer’s full colour range; allow for 2 colours.

.2 Carpet grippers: types recommended by carpet manufacturer.

.3 Seaming tape: types recommended by carpet manufacturer for purpose intended.

.4 Seaming adhesive: type recommended by carpet manufacturer for purpose intended.

.5 Binder bars: type recommended by carpet manufacturer.

.6 Adhesive:

.1 Acrylic release type: recommended by carpet manufacturer.

.2 Low VOC content in accordance with CRI requirements:

.1 Total volatile organic compounds: [10.0]mg/m /hr.

.2 Formaldehyde: [0.05] mg/m /hr.

.3 2-Ethyl-1l-Hexanol: [3.0] mg/m /hr.

.7 Carpet protection: non-staining heavy duty kraft paper.

.8 Concrete floor sealer: to CAN/CGSB-25.20, Type1.

.9 Subfloor filler: white premix latex requiring only water to produce cementitious paste.

.10 Metal Edge/Transition Strips: Extruded aluminum with mill finish of width shown and height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints. Provide at edging between carpet flooring and all other floor materials. Submit for review by Consultant prior to installation.

2.5 RECLAIMATION

.1 All carpet provided under this contract to be removed at the end of its' life cycle is at no cost to the Owner and must be sent for reclamation. Manufacturers must provide certification that reclaimed carpet will not go to landfill.

.2 Reclamation to be third party certified.

3.0 - EXECUTION

3.1 Preparation

1 Prepare floor surfaces in accordance with Contract Carpet Manual, Standard for Installation of Textile Floorcovering Materials No.001.

.2 Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:

.1 Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing moisture and pH tests as recommended by carpet tile manufacturer.

.2 Use trowelable leveling and patching compounds that contain a cementitious base with a latex additive, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.

.3 Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.

.3 Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

.4 Pre-condition carpeting following manufacturer's printed instructions.

.3 Install toeless type resilient base before proceeding with carpeting.

3.2 Installation

.1 Install carpeting using minimum of pieces.

.2 Install in accordance with manufacturer's printed instructions and in accordance with Contract Carpet Manual, Standard for Installation of Textile Floorcovering Materials No.001.

.3 Finish installation to present smooth wearing surface free from conspicuous seams, burring and other faults.

.4 Use material from same dye lot. Ensure colour, pattern and texture match within any one visual area. Maintain constant pile direction.

.6 Fit neatly around architectural, mechanical, electrical and telephone outlets, and furniture fitments, around perimeter of rooms into recesses, and around projections.

3.3 Application of Rubber Base

.1 Lay out base to keep number of joints at minimum.

.2 Clean substrate and prime with one coat of adhesive.

.3 Apply adhesive to back of base.

.4 Set base against wall and floor surfaces tightly by using 3 kg hand roller.

.5 Install straight and level to variation of 1:1000.

.6 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.

.7 Cope internal corners. Use premoulded corner units for right angle external corners. Use formed straight base material for external corners of other angles.

3.4 Protection of Finished Work

.1 Perform the following operations immediately after installing carpet tile:

.1 Remove excess adhesive, and other surface blemishes using cleaner recommended by carpet tile manufacturer.

.2 Remove yarns that protrude from carpet tile surface.

.3 Vacuum carpet tile using commercial machine with face-beater element.

.2 Protect installed carpet tile to comply with Carpet & Rug Institute Installation Standard 2011, "Protecting Indoor Installations."

.3 When construction or move-in activities will continue where new carpet is installed, provide non-staining building material paper to protect carpet. Do not use plastic sheeting as it can trap moisture, and self-sticking plastic sheeting can transfer adhesive residue to carpet that will attract soil.

.4 When heavy objects are moved over carpet within 24 hours of installation, use plywood over carpet to prevent buckling and wrinkling.

.5 Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION

PART 1 - GENERAL

1.1 References

.1 Architectural Painting Specifications Manual, Master Painters Institute (MPI).

.2 Systems and Specifications Manual, SSPC Painting Manual, Volume Two, Society for Protective Coatings (SSPC).

.3 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the Environmental Protection Agency (EPA).

.4 National Fire Code of Canada.

1.2 Quality Assurance

.1 Contractor shall have a minimum of five years proven satisfactory experience. When requested, provide a list of last three comparable jobs including, job name and location, specifying authority, and project manager.

.2 Qualified journeymen who have a "Tradesman Qualification Certificate of Proficiency" shall be engaged in painting work. Apprentices may be employed provided they work under the direct supervision of a qualified journeyman in accordance with trade regulations.

.3 Conform to latest MPI requirements for interior painting work including preparation and priming.

.4 Materials primers, paints, fillers, thinners, solvents, etc. shall be in accordance with MPI Painting Specification Manual "Approved Product" listing and shall be from a single manufacturer for each system used.

.5 Other paint materials such as linseed oil, shellac, turpentine, etc. shall be the highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and shall be compatible with other coating materials as required.

.6 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Consultant.

.7 Standard of Acceptance:

.1 Walls: No defects visible from a distance of 1000 mm at 90 degrees to surface.

.2 Ceilings: No defects visible from floor at 45 degrees to surface when viewed using final lighting source.

.3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

1.3 Environmental Performance Requirements

.1 Provide paint products meeting MPI "Environmentally Friendly"ratings based on VOC (EPA Method 24) content levels.

1.4 Scheduling of Work

1 Submit work schedule for various stages of painting to Consultant for approval. Submit schedule minimum of 48 hours in advance of proposed operations.

.2 Obtain written authorization from Consultant for any changes in work schedule.

.3 Schedule painting operations to prevent disruption of occupants in and about the building.

1.5 Quality Control

.1 When requested by Consultant prepare and paint designated surface, area, room or item in each colour scheme to requirements specified herein, with specified paint or coating showing

selected colours, gloss/sheen, textures and workmanship to MPI Painting Specification Manual standards for review and approval. When approved, surface, area, room and/or items shall become acceptable standard of finish quality and workmanship for similar on-site work.

1.6 Delivery, Handling and Storage

.1 Deliver, store and handle materials in accordance with Section 01 60 00 - Product Requirements.

.2 Labels shall clearly indicate:

.1 Manufacturer's name and address.

.2 Type of paint or coating.

.3 Compliance with applicable standard.

.4 Colour number in accordance with established colour schedule.

.3 Remove damaged, opened and rejected materials from site.

.4 Provide and maintain dry, temperature controlled, secure storage.

.5 Observe manufacturer's recommendations for storage and handling.

.6 Store materials and supplies away from heat generating devices.

.7 Store materials and equipment in a well ventilated area with temperature range 7C to 30C.

.8 Store temperature sensitive products above minimum temperature as recommended by manufacturer.

.9 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Consultant. After completion of operations, return areas to clean condition to approval of Consultant.

.10 Remove paint materials from storage only in quantities required for same day use.

.11 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

.12 Fire Safety Requirements:

.1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.

.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.7 Site Requirements

.1 Heating, Ventilation and Lighting:

.1 Ventilate enclosed spaces

.2 Perform no painting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10 C for 24 hours before, during and after paint application until paint has cured sufficiently.

.3 Where required, provide continuous ventilation for seven days after completion of application of paint.

.4 Coordinate use of existing ventilation system with Contractor and ensure its operation during and after application of paint as required.

.5 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.

.6 Perform no painting work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted. Adequate lighting facilities shall be provided by General Contractor.

.2 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Unless specifically pre-approved by the specifying body, Paint Inspection Agency and the applied product manufacturer, perform no painting work when:

.1 Ambient air and substrate temperatures are below 10 C.

.2 Substrate temperature is over 32 C unless paint is specifically formulated for application at high temperatures.

.3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.

.4 The relative humidity is above 85% or when the dew point is less than 3 C variance between the air/surface temperature.

.5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.

.2 Perform no painting work when the maximum moisture content of the substrate exceeds:

.1 12% for concrete and masonry (clay and concrete brick/block).

.2 15% for wood.

.3 12% for plaster and gypsum board.

.3 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple "cover patch test".

.4 Test concrete, masonry and plaster surfaces for alkalinity as required.

.3 Surface and Environmental Conditions:

.1 Apply paint finish only in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.

.2 Apply paint only to adequately prepared surfaces and to surfaces within moisture limits noted herein.

.3 Apply paint only when previous coat of paint is dry or adequately cured.

.4 Additional Interior Application Requirements:

.1 Apply paint finishes only when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.

.2 Apply paint in occupied facilities during silent hours only. Schedule operations to approval of Owner such that painted surfaces will have dried and cured sufficiently before occupants are affected

1.8 Extra Materials

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

.2 Submit – (one) four litre can of each type and colour of primer, stain, and finish coating. Identify colour and paint type in relation to established colour schedule and finish system.

.3 Deliver to Owner and store where directed.

PART 2 - PRODUCTS

2.1 Materials

.1 Paint and fillers shall be manufacture's premium quality, of type and brand herein specified and listed under "Paint Product Recommendations" premium grade as covered in the association manual, latest edition, for specific uses and only as supplied by **Pratt & Lambert Co., Benjamin Moore & Co., Para Paints Canada Inc., ICI Paints (Canada) Inc, (Glidden), Sherwin Williams Canada Inc., Pittsbugh Paints**. Paint material such as linseed oil, shellac, turpentine and the like, and any of the materials not specifically mentioned herein but required for first class work with finish specified shall be highest quality product of approved manufacturer. Where specific products are indicated in painting schedule, use product manufacturer as specified.

.2 Paint materials for paint systems shall be products of a single manufacturer.

.3 Only qualified products with "Environmentally Friendly" rating are acceptable for use on this project.

.4 Water-borne surface coatings must be manufactured and transported in a manner that steps of process, including disposal of waste products arising therefrom, will meet requirements of applicable governmental acts, by-laws and regulations including, for facilities located in Canada, Fisheries Act and Canadian Environmental Protection Act (CEPA).

.5 Water-borne surface coatings must not be formulated or manufactured with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavelant chromium or their compounds.

.6 Water-borne surface coatings and recycled water-borne surface coatings must have a flash point of 61.0 C or greater.

.7 Both water-borne surface coatings and recycled water-borne surface coatings must be made by a process that does not release:

.1 Matter in undiluted production plant effluent generating a 'Biochemical Oxygen Demand' (BOD) in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.

.2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.

.8 Water-borne paints and stains, recycled water-borne surface coatings and water borne varnishes must meet a minimum "Environmentally Friendly" rating.

.9 Recycled water-borne surface coatings must contain 50 % post-consumer material by volume.

.10 Recycled water-borne surface coatings must not contain:

.1 Lead in excess of 600.0 ppm weight/weight total solids.

.2 Mercury in excess of 50.0 ppm weight/weight total product.

.3 Cadmium in excess of 1.0 ppm weight/weight total product.

.4 Hexavelant chromium in excess of 3.0 ppm weight/weight total product.

.5 Organochlorines or polychlorinated biphenyls (PCBS) in excess of 1.0 ppm weight/weight total product.

.11 The following must be performed on each batch of consolidated post-consumer material before surface coating is reformulated and canned. These tests must be performed at a laboratory or facility which has been accredited by the Standards Council of Canada.

.1 Lead, cadmium and chromium are to be determined using ICP-AES (Inductively Coupled Plasma - Atomic Emission Spectroscopy) technique no. 6010 as defined in EPA SW-846.

.2 Mercury is to be determined by Cold Vapour Atomic Absorption Spectroscopy using Technique no. 7471 as defined in EPA SW-846.

.3 Organochlorines and PCBs are to be determined by Gas Chromatography using Technique no. 8081 as defined in EPA SW-846.

2.2 Colours

.1 Consultant will provide Colour Schedule after Contract award.

.2 Interior Colours will be based upon the selection of two (2) base colours and three (3) accent colours. Include for 25% dark tones.

.3 Not used

.4 Selection of colours will be from manufacturers full range of colours.

.5 Where specific products are available in a restricted range of colours, selection will be based on the limited range.

.6 Second coat in a three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 Mixing and Tinting

1 Perform colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials is allowed only with Consultant's written permission.

.2 Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.

.3 Where thinner is used, addition shall not exceed paint manufacturer's recommendations. Do not use kerosene or any such organic solvents to thin water-based paints.

.4 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 Gloss/Sheen Ratings

.1 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following values:

Gloss Level	Description	Units @ 60 degrees	Units @ 85 degrees
G1	Matte of Flat finish	0 to 5	10 max
G2	Velvet Finish	0 to10	10 to 35
G3	Eggshell Finish	10 to 25	10 to 35
G4	Satin Finish	20 to 35	35 min
G5	Semi-Gloss Finish	35 to 70	
G6	Gloss Finish	70 to 85	
G7	High Gloss Finish	➢ 85	

.2 Gloss level ratings of painted surfaces shall be as specified herein and as noted on Finish Schedule

2.5 Interior Painting Systems

.1 Plaster and Drywall: Int 9.2A Latex (G3) finish over latex sealer

.2 Plaster and Gypsum Board Ceilings: Int 9.2A Latex (G1) finish over latex sealer

.3 Concrete Unit Masonry: PT: Int 4.2A Latex (G3) finish.

.4 Metal fabrications/trim: Int 5.1E (G5) finish.

.5 Galvanized metal/zinc coated steel: Int 5.3L (G5) finish

.6 Dressed lumber (including doors): INT 6.3T Latex (G5) finish over latex primer.

.7 Use fire retardant paint on fire rated plywood sheets behind electrical panels.

All Finishing System Codes are from the Ontario Painting Contractors Association.

2.6 Exterior Painting Systems

.1 Galvanized Metal (doors/frames/misc fabrications): EXT 5.3A Latex (G5) finish.

.2 Wood paneling/soffits: EXT 6.4D semi-transparent stain finish.

All Finishing System Codes are from the Ontario Painting Contractors Association.

PART 3 - EXECUTION

3.1 General

.1 Perform preparation and operations for interior painting in accordance with MPI Painting Specifications Manual except where specified otherwise.

.2 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.2 Existing Conditions

1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Consultant damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

.2 Conduct moisture testing of surfaces to be painted using a properly calibrated electronic moisture meter, except test concrete floors for moisture using a simple "cover patch test" and report findings to [Consultant] [Engineer]. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

.3 Maximum moisture content as follows:

.1 Stucco, Plaster and Gypsum Board: 12%.

.2 Concrete: 12%.

.3 Clay and Concrete Block/Brick: 12%.

.4 Wood: 15%.

3.3 Protection

.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces as directed by Consultant.

.2 Protect items that are permanently attached such as Fire Labels on doors and frames.

.3 Protect factory finished products and equipment.

.4 Protect passing pedestrians, building occupants and general public in and about the building.

.5 Removal of electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings shall be done prior to undertaking any painting operations by General Contractor. Items shall be securely stored and re-installed after painting is completed by General Contractor.

.6 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.

.7 As painting operations progress, place "WET PAINT" signs in occupied areas to approval of Consultant

3.4 Cleaning and Preparation

.1 Clean and prepare surfaces in accordance with MPI Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:

.1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths or compressed air.

.2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.

.3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.

.4 Allow surfaces to drain completely and allow to dry thoroughly.

.5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.

.6 Use trigger operated spray nozzles for water hoses.

.7 Many water-based paints cannot be removed with water once dried. However, minimize the use of kerosene or any such organic solvents to clean up water-based paints.

.2 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

.3 Where possible, prime surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.

.1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.

.2 Apply wood filler to nail holes and cracks.

.3 Tint filler to match stains for stained woodwork.

.4 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

.5 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes, blowing with clean dry compressed air, or vacuum cleaning.

.6 Touch up of shop primers with primer as specified in applicable section. Major touch-up including cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas, shall be by supplier of fabricated material.

.7 Do not apply paint until prepared surfaces have been accepted by Consultant.

3.5 Application

1 Method of application to be as approved by Consultant. Apply paint by brush or roller. Conform to manufacturer's application instructions unless specified otherwise.

.2 Brush and Roller Application:

.1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.

.2 Work paint into cracks, crevices and corners.

.3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.

.4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Consultant

.5 Remove runs, sags and brush marks from finished work and repaint.

.3 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access and only when specifically authorized by Consultant.

.4 Apply coats of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.6 Sand and dust between coats to remove visible defects.

.7 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges and behind wall mounted items.

3.6 Mechanical/Electrical Equipment

.1 Unless otherwise specified, paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as noted otherwise.

.2 Boiler room, mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.

.3 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.

.4 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.

.5 Do not paint over nameplates.

.6 Keep sprinkler heads free of paint.

.7 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.

.8 Paint fire protection piping red, if required.

.9 Paint disconnect switches for fire alarm system and exit light systems in red enamel.

.10 Paint natural gas piping yellow.

.11 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

.12 Do not paint interior transformers and substation equipment.

3.7 Field Quality Control

.1 Advise Consultant when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

3.8 Restoration

.1 Clean and re-install all hardware items removed before undertaking painting operations.

.2 Remove protective coverings and warning signs as soon as practical after operations cease.

.3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.

.4 Protect freshly completed surfaces from paint droppings and dust to approval of Consultant. Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

END OF SECTION

1.0 GENERAL

1.1 SECTION INCLUDES

.1 Manually operated, roll-up fabric interior window shades including mounting and operating hardware.

.2 Opaque window shade system: Manually operated, roll-up fabric opaque window shade system for complete blackout of window opening including side and bottom channels, headbox, opacity plates, manual operator, and mounting hardware.

.3 Motor operated fabric interior window shades.

1.2 REFERENCES

.1 All window coverings offered must meet the HAZARDOUS PRODUCTS ACT, Regulation SOR/2009-112, Sep 8, 2009 - Corded Window Covering Products Regulations

.2 All window coverings offered must meet the CSA Z600-08 - Safety of Corded Window Covering Products standard including but not limited to meeting the product safety requirements of section 4 and the labeling and information requirements of section 5

1.3 SUBMITTALS

.1 Submit under provisions of Section 01 33 00 - Submittal Procedures:

.2 Product Data: Manufacturer's data sheets on each product specified, including:

.1 Preparation instructions and recommendations.

.2 Installation and maintenance instructions.

.3 Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.

.4 Storage and handling requirements and recommendations.

.5 Mounting details and installation methods.

.3 Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings, field verified window dimensions, quantities, type of shade, controls, fabric, and color, and include opening sizes and key to typical mounting details.

.4 Verification Samples: For each finish product specified, two complete sets of shade components, unassembled, demonstrating compliance with specified requirements. Shade fabric sample and aluminum finish sample as selected, representing actual product, color, and patterns. Mark face of material to indicate interior faces.

.5 Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

.6 Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Do not deliver window shades until building is enclosed and construction within spaces where shades will be installed is substantially complete.

.2 Deliver products in manufacturer's original, unopened, undamaged containers with labels intact.

.3 Label containers and shades according to Window Shade Schedule.

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

1.5 SEQUENCING

.1 Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.

.2 Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.6 PROJECT CONDITIONS

.1 Install roller shades after finish work and ambient temperature, humidity and ventilation conditions are maintained at levels recommended for project upon completion.

2.0 PRODUCTS

2.1 MANUFACTURERS

.1 SOLARFECTIVE/LEGRAND.

.2 HUNTER DOUGLAS CANADA.

.3 Equivalent products as per 01 25 00.

2.2 MANUALLY OPERATED WINDOW SHADES

.1 Manually Operated Window Shades with Independent Control: Manually operated, vertical roll-up, fabric window shade with components necessary for complete installation**.**

.1 Operation: Bead chain and clutch operating mechanism allowing shade to stop when chain is released. Designed never to need adjustment or lubrication. Provide limit stops to prevent shade from being raised or lowered too far.

.1 Clutch mechanism: Fabricated from high carbon steel and molded fiberglass reinforced polyester or injected molded nylon.

.2 Bead chain loop: Stainless steel bead chain hanging at side of window.

.3 Idler Assembly: Provide roller idler assembly of molded nylon with adjustable length idler pin to facilitate easy installation, and removal of shade for service.

.2 Mounting:

.1 Mounting brackets.

.2 Endcaps and headbox.

.3 Roller Tube: Fabricated from extruded aluminum, galvanized steel, or enameled steel. Diameter, wall thickness, and material selected by manufacturer to accommodate shade type and size. Fabric connected to the roller tube with LSE (low surface energy) double sided adhesive specifically developed to attach coated textiles to metal. Adhesive attachment to eliminate horizontal impressions in fabric.

.4 Endcaps: Stamped steel with universal design suitable for mounting to ceiling, wall, and jamb. Provide size compatible with roller size.

.1 Endcap covers: To match fascia or headbox color.

.5 Brackets: Plated stamped steel. Provide size compatible with roller size.

.1 Mounted to wall.

.6 Coupling system: Provide system to operate shades from single crank by coupling shade rollers together. System to consist of endcaps, plus couplings to connect rollers.

.1 2 shades operated from single control when practical/indicated on drawings.

.7 Fascia: L shaped aluminum extrusion to conceal shade roller and hardware.

.1 Attachment: Snaps onto endcaps without requiring exposed fasteners of any kind. Fascia can be mounted continuously across two or more shade bands.

.2 Finish: Clear anodized.

2.3 OPAQUE WINDOW SHADE SYSTEM (BLACKOUT BLINDS)

.1 Operation: Bead chain and clutch operating mechanism allowing shade to stop when chain is released. Designed never to need adjustment or lubrication. Provide limit stops to prevent shade from being raised or lowered too far.

.1 Clutch mechanism: Fabricated from high carbon steel and molded fiberglass reinforced polyester.

.2 Bead chain loop: Stainless steel bead chain hanging at side of window.

.2 Roller Tube: Fabricated from extruded aluminum, galvanized steel, or enameled steel. Diameter, wall thickness, and material selected by manufacturer to accommodate shade type and size. Fabric connected to the roller tube with LSE (low surface energy) double sided adhesive specifically developed to attach coated textiles to metal. Adhesive attachment to eliminate horizontal impressions in fabric.

.3 Headbox: Consists of extruded aluminum sections with endcaps and opacity plates.

.1 Size: 4-1/8 inches (105 mm) high by 3-1/2 inches (89 mm) wide by length required for shade being provided.

.2 L-shaped removable front face and bottom cover and L-shaped back and top.

.3 Endcaps: Stamped steel with universal design suitable for mounting to ceiling, wall, and jamb. Provide size compatible with roller size.

.4 Side Channels: Double chamber fabricated from 0.06 inch (1.5 mm) thick extruded retainer. Other chamber accepts fabric guide and channel locator. One chamber accepts fabric and contains groove for fabric retainer. Other chamber accepts fabric guide and channel locator.

.5 Sill channel: 0.06 inch (1.5 mm) thick extruded aluminum channel to receive slat bar and prevent light leakage

.6 Slat bar: Extruded aluminum bar attached to bottom of shade. Bar does not retract into headbox.

.7 Channel locator: Injected molded nylon insert to align side and sill channels with headbox.

.8 Fabric guide: Plated steel transition for fabric rolling into side channel.

.9 Fabric retainer: System designed to prevent disengagement of fabric from side channels due to normal variations of air pressure caused by doors opening, HVAC systems, and temperature differences between room and window well. System consists of horizontal steel stays installed in shade, covered with fabric, and spaced at regular intervals. Grommets installed through stays are held within groove of side channel chamber.

.10 Opacity plates: Steel plates with rubber O rings installed on end caps to eliminate light leakage.

.11 Exposed aluminum finish:

.1 Finish: Clear anodized aluminum.

2.4 MOTORIZED WINDOW SHADES

1. Basis of Design: Legrand Solarfective Teleshade TS Series DLM Shading System: System shall be a quiet motorized shade system sunscreen or opaque roll or double contained in a factory assembled shade cassette unit.

.2 Motors:

.1 Tubular, asynchronous (non-synchronous) motors with a 3 conductor keyed AC power plug at the motor head that can be detached at the motor head assembly directly. Concealed inside roller shade tube. Quiet operation of up to 44dBa within 3’.

.2 Intelligent AC motor 115 VAC, 50-60 Hz, thermally protected, lifetime lubricated, equipped with an internal thermal overload protector. Maximum current draw not to exceed 0.9 amps

when operating up to an overall width of 156", or a maximum current of 1.8 amps when operating 156"+ overall width.

.3 Provide the ability to set limit stop positioning (maximum up/down limits) through 3 clear buttons with internal LED's.

.4 Use motors rated at the same nominal speed for all rollershades in the same room.

.5 Total hanging weight of shade band shall not exceed 80 percent of the rated lifting capacity of 6Nm when operating up to 156" overall width, and 12Nm when operating 156"+ overall width.

.6 Motors must include an embedded Motor Control System without requiring any external motor logic control system outside of the motor assembly unit itself.

.2 Keypad/Local User Override

.1 Allow for keypad switch control for up to 24 buttons connected directly to the motor assembly to allocate for individual and group control, with up to four intermediate stop positions.

.2 Connect local wall switches/keypads directly to the motor assembly itself via a low voltage (DC) CAT5/RJ25 cable. A low voltage (DC) splitter is used to connect the keypad to the motor, and to allow for communication/direct connection to adjacent motors in the same network.

.3 Motor Control Systems:

.1 Must be integrated into the motor unit itself. External motor control systems that require "home run" 110v line voltage will not be accepted.

.2 Motor Control System must provide bidirectional feedback, allowing for two-way communication between the motor with embedded internal motor control system and it's point of communication.

.3 Motor control system allows for backward compatibility to allow for the add-on of building automation system integration, audio-visual systems, third party light control systems, light sensors, Radio Frequency and Infrared Remote operation, all through means of plugging into the splitter via a low voltage (DC) CAT6/RJ25 plug-in.

.4 Allow for up to four intermediate stop positioning via the keypad/local-user override.

.5 Reconfiguration of switch shall not require rewiring of the hardwired line voltage motor power supply wiring, or the low voltage control wiring. Reconfiguration of switch groups shall be accomplished within the motor control device.

.4 Accessories

.1 ROLLER TUBE: Circular-shaped aluminum tube extruded from alloy and temper 6063 T-6**.** 2"outside diameter extruded tube to have a .063" wall thickness (2.5" outside diameter to have a .079" wall thickness). Heavily reinforced with minimum six internal ribs providing additional tensile strength and allows for secure placement of clutch & end plug.

.2 HEAVY DUTY TUBE BEARING PLUG: Die cast metal and reinforced idler assembly containing spring loaded end plug with positive locking wheel allows for up to 7/8" adjustment and provides for a secure installation and removal of shade. Locking tube bearing plug contains minimum 6 ribs and inserted a minimum of 2-3/8" into roller tube.

.3 BOTTOM BAR: Extruded aluminum weight in a Sealed Pocket Hem Bar, or RB Bottom Bar for fabrics that are not seamable. Bottom bar is for tracking adjustments and provides uniform look.

.4 MOUNTING HARDWARE: Manufacturer's standard heavy duty bracket constructed of hardened 1/8" thick steel to support full weight of shade with bracket & screw hole covers to provide uniform look. Integrated leveling device for enhanced level adjustment of overall shade. Locking mechanism on bracket adapter provides for a secure installation and removal of the shade.

.5 FASCIA: L shape removable aluminum extrusion valance that attaches to brackets and conceals roller shade. Finish: clear anodized. To be provided where exposed.

.6 ROLLER SHADE POCKET: Extruded aluminum alloy U shape housing for recessed mounting in acoustical tile or drywall ceilings. 5.25” (or 9”) in diameter with aluminum closure mount, to be provided where detailed.

2.5 FABRIC

.1 Light Filtering Fabrics

.1 Shade cloth shall be woven of .018 opaque, vinyl coated polyester yarn consisting of approximately 79% vinyl and 21% 500 dernier polyester core yarn. The fabric shall be tensioned in the finishing range prior to heat setting to keep the warp ends straight and minimize or eliminate weave distortion to keep the fabric flat. The fabric shall be dimensionally stable. Colour to be as selected from standard range.

.2 Average 3% open.

.2 Room Darkening Fabrics (Blaockout Blinds)

.1 Room Darkening Shade -100 opaque material shall be 3 ply (4 mil thickness) vinyl laminated to both sides of 100 fibreglass base 13 gauge thickness. If sewn, needle holes shall not permit light penetration. Washable with mild soap and water. Colours to be as selected from standard range in widths up to 72"

.3 Performance – As a “shade cloth” the fabric shall hang flat without buckling or distortion. The edge, when trimmed, shall hang straight without raveling. An unguided roller shade Cloth shall roll true and straight, without shifting sideways more than +1/8” in either direction due to warp distortion, or weave design.

.4 Flame Retardance - Fabric shall be certified by an Independent Laboratory to pass the Small Scale Vertical Burn Requirements test CAN and ULC-S109-M87 and NFPA 701.

.5 The fabric supplied shall be GREENGUARD certified or approved equivalent.

2.6 Schedule

.1 As indicated in drawings.

3.0 EXECUTION

3.1 EXAMINATION

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

.2 If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

.1 Coordinate requirements for blocking and structural supports to ensure adequate means for installation of window shades.

3.3 INSTALLATION

.1 Install in accordance with manufacturer's instructions.

.2 Install roller shades level, plumb, square, and true. Allow proper clearances for window operation hardware.

.3 Install the following items to conceal roller and operating mechanism. Do not use exposed fasteners.

.1 Fascias.

.2 Closure panels.

.3 Endcaps.

3.4 TESTING AND DEMONSTRATION

.1 Test window shades to verify that operating mechanism, fabric retainer, and other operating components are functional. Correct deficiencies.

.2 During daylight hours, lower shades and turn off interior lights. Verify that there are no light leaks at perimeter or within shade assembly. Correct deficiencies.

3.5 PROTECTION

.1 Protect installed products until completion of project.

.2 Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

.1 The work described in this Section shall include furnishing all equipment, labour, materials and services to perform excavation, backfilling and site grading, as shown on the drawings and specified herein.

.2 The conditions of the Contract Division 1 apply to this section in full, as if repeated herein.

.3 All depths of materials indicated on the drawings and in these specifications refer to minimum required depth of materials, after compacting.

.4 Excavation, backfilling and site grading for this Work includes, but is not necessarily limited to;

.1 Stripping and disposal off-site of native topsoil that is surplus or has been indicated by the Consultant to be undesirable.

.2 All required excavation.

.3 Stockpiling and reuse of on-site fill material approved by the Consultant.

.4 Disposal off-site of cut material that is surplus or has been indicated by the Consultant to be undesirable.

.5 Supplying imported topsoil and granular materials as well as trucking them to the site.

.6 Filling, backfilling and compacting granular materials, amended native topsoil or imported topsoil to attain indicated final grades.

1.02 REFERENCES

.1 ASTM D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).

.2 OPSS, Ontario Provincial Standard Specification.

1.03 INSPECTION AND TESTING

.1 Contractor shall coordinate third party inspection and testing of the Work of this Section. Cost of third party inspection and testing shall be paid for from project Cash Allowance.

.2 Contractor shall coordinate third party washed sieve gradation analysis for all aggregates and granular materials to be used in accordance with MTO Laboratory Testing Manual Section LS-602 and related standards.

.3 Contractor shall coordinate third party field inspections and compaction testing of all compacted sub-grade and base materials in accordance with MTO Laboratory Testing Manual Section LS-623 and related standards.

.4 Contractor shall maintain a record showing the location and result of inspections and testing conducted. These records shall be submitted to the Consultant when requested, or prior to proceeding with work that depends upon the work of this Section.

1.04 SOURCE QUALITY CONTROL

.1 Consultant must approve the soils and granular materials for use. If testing is required, it is to be paid for by the Contractor.

1.05 BURIED SERVICES

.1 Before commencing work verify / establish location of buried services on and adjacent to site.

.2 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.3 Prior to beginning excavation Work, notify applicable authorities having jurisdiction and establish location and state of use of buried utilities and structures. Clearly mark such locations to prevent disturbance during Work.

.4 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.

.5 Where utility lines or structures exist in area of excavation, obtain direction of Consultant before re-routing or removing.

.6 Record location of maintained, re-routed and abandoned underground lines.

1.06 EXISTING BUILDINGS AND SURFACE FEATURES

.1 Conduct a condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by Work. Document findings and submit photographic records to Owner/Consultant before commencing Work.

.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Consultant.

PART 2 - PRODUCTS

2.01 MATERIALS

.1 Granular ‘A’ and ‘B’: All structural backfill material shall be manufactured granular crushed from limestone rock, described as Granular ‘A’ and Granular ‘B’, conforming to the requirements of Ontario Provincial Standard Specification OPSS 1010, “Material Specifications for Aggregates - Granular A, B, M and Select Subgrade Material”. Reclaimed concrete material (RCM) is not acceptable.

.2 Crushed stone: 19 mm (or 20 mm) crushed stone (“crusher run”) shall be clean, durable, angular crushed gravel or stone conforming to the following limits:

Sieve Designation	% Passing
19.0mm	100%
4.75mm	40-80%
2.36mm	27-65%
600µm	12-35%

.3 Clear Stone: 19 mm (or 20 mm) clear stone shall be clean, durable, angular crushed gravel or stone conforming to the following limits:

Sieve Designation	% Passing
19.0mm	100%
4.75mm	2%

.4 Fill Material: Selected material from excavation or other sources, approved by the Consultant for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse, contaminants or other deleterious materials.

.5 All other materials not specifically described but required for a complete and proper installation, shall be selected by the Contractor, subject to the review of the Consultant.

.6 Geotextile: ‘Terrafix 270 R’ by Terrafix Geosynthetics Inc. or approved alternative.

PART 3 - EXECUTION

3.01 REMOVAL OF TOPSOIL

.1 Remove all topsoil from areas to be excavated or regraded. Strip topsoil when it is dry enough to prevent contamination with sub-grade material.

.2 Do not handle topsoil in wet or frozen condition.

.3 Stockpile any available topsoil on-site where directed. Piles shall not exceed 2000 mm in height.

3.02 EXCAVATION

.1 Provide, install and maintain adequate fences and barricades.

.2 Excavate to lines, grades, elevations and dimensions indicated on the Drawings.

.3 Have excavations in excess of 1200 mm in depth conform to requirements of Occupational Health and Safety Act, and Regulations for Construction Projects.

.4 Remove concrete, masonry, rubble and other obstructions encountered during excavation and dispose of legally off-site.

.5 Excavation required within proximity of underground utility lines or within the dripline of trees designated to remain are to be made by hand.

.6 Excavation must not interfere with normal 45 plane of bearing from the bottom of any footing.

.7 Do not disturb soil within branch spread of trees or shrubs that are to remain.

.1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw in accordance with applicable Municipal regulations.

.8 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic material.

3.03 DEWATERING

.1 Keep excavations free of water while Work is in progress.

.2 Avoid excavation below groundwater table if quick condition or heave is likely to occur. Prevent piping or bottom heave of excavations by groundwater lowering, or other means.

.3 Protect open excavations against flooding and damage due to surface run-off.

.4 Dispose of accumulated water in a manner not detrimental to public and private property, or any portion of Work completed or under construction.

.5 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers.

3.04 OVER-EXCAVATION

.1 Where excavations are made below the indicated intended elevations, backfill with lean concrete, unshrinkable fill, crushed stone or granular material as directed by the Consultant. Compact to provide a firm, unyielding sub-grade at no additional cost to the Owner.

3.05 BACKFILL

.1 Do not place, spread or compact any backfill materials during unfavourable weather. Unfavourable weather includes temperatures below 0 C and/or precipitation.

.2 Do not commence any backfill operation without adequate compaction equipment.

.3 Protect the site of the backfilling and storage of backfill materials from freezing.

.4 Prior to placing backfill, scarify the sub-grade surface to a depth of 50 mm.

.5 During backfilling, take care to avoid displacing or damaging Utilities Work and Services.

3.06 COMPACTION

.1 All layers of backfill material shall be compacted to not less than the minimum density specified. The Contractor is not to proceed until approval of compaction has been granted.

.2 Granular 'B' backfill and native material shall be compacted to 98% standard proctor dry density in layers not exceeding 225 mm thickness.

.3 Granular 'A' backfill shall be compacted to 98% standard proctor dry density in layers not exceeding 150 mm thickness.

.4 For all backfill material, bring to the moisture content that will permit proper compaction.

.5 For all granular material, bring to the moisture content of plus or minus 2% of optimum moisture content.

.6 Optimum moisture content shall be determined for each type of material to be compacted in accordance with ASTM D1557.

.7 Type of compaction equipment selected by the Contractor is subject to the review of the Consultant.

3.07 STORAGE AND STOCKPILING OF MATERIALS

.1 Stockpiled and imported materials to be stored away from existing trees, drainage areas and access points.

3.08 SITE GRADING

.1 Perform all rough and finish grading and backfilling required to achieve the finished elevations indicated on the Drawings.

.2 Ensure that the finished ground slopes are as indicated on the Drawings.

.3 Regrade all areas that retain or pond water.

.4 All areas shall be rough graded within a tolerance of plus or minus 50 mm.

3.09 DISPOSAL OF EXCAVATED MATERIALS

.1 All excavated sub-grade material generated by construction, may be used as fill on-site unless otherwise rejected by the Consultant, in which case it is to be disposed of legally off-site at a location determined and paid for by the Contractor.

.2 All surplus sub-grade material generated by construction and not required to attain indicated final grades is to be disposed of legally off-site at a location determined and paid for by the Contractor.

.3 Any required testing of excavated material to be disposed of off-site shall be arranged and paid for by the Contractor.

END OF SECTION

PART 1 – GENERAL

1.0 General Instructions

.1 Read and be governed by Conditions of the Contract and Sections of Division 1

.2 Provide concrete work including, but are not limited to;

.1 Concrete pavement, steps, walks and curbs.

.2 Footings as required and/or as indicated on Drawings.

1.1 Reference Standards

.1 ASTM A1064/A1064-M, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

.2 ASTM C94, Standard Specification for Ready-Mixed Concrete.

.3 ASTM C309, Specification For Membrane-Forming Compounds for Curing Concrete.

.4 CAN/CSA A23.1/A23.2-M, Concrete Materials and Methods of Concrete Construction/Methods of Tests For Concrete.

.5 CAN/CSA A23.3, Design of Concrete Structures.

.6 CAN/CSA A3000, Cementitious Materials Compendium.

.7 CSA O121, Douglas Fir Plywood.

.8 CAN/CSA S269.3-M, Concrete Formwork.

.9 OPSS Ontario Provincial Standard Specification.

.10 Construct Municipal sidewalks to requirements of jurisdictional authorities.

1.2 DESIGN REQUIREMENTS

.1 Design concrete so that material will not segregate and excessive bleeding will not occur.

.2 Design falsework / formwork in accordance with CAN/CSA S269.3-M.

1.3 SUBMITTALS

.1 Concrete Mix Designs: Submit concrete mix designs for review.

.2 Concrete Pour Records: Record time, date, delivery slip serial number and location of each concrete pour and identify related test cylinders. Keep these records on-site until project is completed.

1.4 INSPECTION AND TESTING

.1 Contractor shall coordinate inspection and testing of the Work of this Section, cost for testing shall be paid for from project Cash Allowance.

.2 Concrete inspection and testing:

.1 Materials: CAN/CSA A23.1/A23.2-M; Inspect and test for conformance to requirements of this Standard and to Specifications.

.2 Tests will be made in accordance with CAN/CSA A23.2-M.

.3 Remove defective materials and completed Work which do not conform to the Contract Documents.

.3 Contractor shall provide washed sieve gradation analysis for all aggregates and granular materials to be used in accordance with MTO Laboratory Testing Manual Section LS-602 and related standards.

.4 Contractor shall carry out field inspections and compaction testing of all compacted sub-grade and base materials in accordance with MTO Laboratory Testing Manual Section LS-623 and related standards.

.5 Inspection Reports: Concrete cylinder test reports shall include:

1. Specific location of concrete represented by sample
2. Design strength
3. Unit weight of sample
4. Exposure class
5. Aggregate size and admixtures incorporated
6. Date, hour and temperature at time sample was taken
7. Percentage air content
8. Test strength of cylinder
9. Type of failure if test fails to meet specification

.6 Testing and Replacement of Deficient Concrete in Place:

.1 Contractor shall pay for additional testing and related expenses if concrete has proved to be deficient.

.2 Contractor shall replace or strengthen deficient concrete Work as directed by the Consultant and pay for all testing and related expenses for replaced Work until approved by the Consultant.

.3 The Contractor shall maintain a record showing the location and result of inspections and testing conducted. These records shall be submitted to the Consultant when requested, or prior to proceeding with work that depends upon the work of this Section.

PART 2 – PRODUCTS

2.1 Materials

.1 Cement: to CAN/CSA-A5-93, type 10, normal.

.2 Water and aggregates: to CAN/CSA-A23.1-94.

.3 Admixtures: to ASTM C 494 for air entraining admixtures.

.4 Granular base: Granular Sub-Base Course: Compacted granular materials as indicated on the Drawings and in accordance with the requirements of Section 31 23 00.

.5 Expansion Joints:

.1 Rigid Expansion Joint Filler shall be non-bituminous pre-moulded joint filler (polyethylene) in 13mm thickness, to OPSS 1308, Type A, except as otherwise shown. Joint filler shall be cut to full cross-section shape as detailed.

.2 Expansion Joint Sealant shall be a fast-setting, 2-part polyeurethane material intended for sealing expansion joints in new exterior concrete applications. Colour to match adjacent concrete surfaces.

.6 Formwork

.1 Formwork materials brought on-site shall be new.

.2 Generally: Douglas Fir, minimum thickness of 17 mm, to CSA O121, finished one side, fabricated specially for use as concrete form panels, with sealed edges, free of warp and of sufficient strength to resist displacement during the placing and consolidation of the concrete. Curved forms shall be of 25 mm nominal thickness.

.3 For concrete surfaces exposed to view, provide panels smooth and free of defects which would be reproduced as concrete blemishes.

.4 Chamfers: cut from smooth, single pieces of wood, with no open defects and of sufficient dimension to construct specified chamfers.

.5 All form work shall be clean and treated with a non-staining mineral oil before concrete is placed, and so constructed as to prevent honeycombing.

.7 Form stripping agent: colourless, mineral oil, free of kerosene, with viscosity minimum 70, maximum 110 second Saybolt Universal at 38°C, flashpoint minimum 150°C open cup.

.8 Curing compound: chlorinated rubber type compound to ASTM C309-97, Type 2 (white), Class A.

.9 Tactile walking surface indicators: Cast iron, stainless steel or reinforced fiberglass with truncated domes to CSA B651. Refer to drawings/details.

2.2 Concrete Mixes

.1 Except where indicated or specified otherwise use concrete mix designed to produce 32MPa minimum compressive strength at 28 days. Exposure to C-2 to CAN/CSA-A23.1-94.

.2 Accelerating admixtures may be used subject to approval in cold weather. If approved use of admixture shall not relax cold weather placement requirements of CAN/CSA-A23.1-94. Use of calcium chloride is not permitted.

.3 Provide 5-8% air entraining agent to mix to improve frost resistance. Comply with CAN/CSA-A23.1-94.

2.3 Coloured Pigments

.1 Pure iron oxide pigments designed specifically for use in the integral coloring of cementitious materials.

.1 Acceptable product: CCI-200 Integracon Colours by Concreation Canada, or equivalent per Spec 01 25 00.

.2 Colours:

.1 Colour to be selected by Consultant from manufacturers full colour range.

PART 3 – EXECUTION

3.1 PROTECTION

.1 Prevent damage to adjacent buildings, wall surfaces, and pavements scheduled to remain.

.2 Keep all traffic off this Work until materials have cured and reached design strength. Because of the public nature of this Work, a 24-hour guard following critical pours may be required.

.3 Protect concrete surfaces exposed to view from grease, oil and other soil that will affect appearance of concrete.

.4 Protect formwork to prevent functional damage and damage to faces affecting appearance of concrete surfaces exposed to view.

.5 Protect concrete from cold temperatures. Provide insulation and/or heat as required.

.6 Barriers and Lights: Contractor shall erect and maintain such barriers and lights as will effectively prevent any accident on the site. The Contractor shall be liable for all damages

3. EXCAVATION

.1 Excavation shall be in accordance with Section 31 23 00, or as required during the course of the Work by the Consultant. Disturbed material in the bottom of the excavation shall be thoroughly consolidated to the satisfaction of the Consultant by rolling or tamping, or both.

.2 Sub-grade shall be excavated or filled with suitable material to the required grades and lines. Filled sections shall be compacted and extend a minimum of 300 mm outside the form lines. Water shall be used as an aid to compaction where required.

.3 Ensure that subgrade of compacted fill conforms to elevations and sections before placing granular base material.

3.2 Granular Base

.1 Contractor shall not proceed with placement of the granular base until the finished sub-grade has been verified by the Consultant.

.2 On the sub-grade brought to the correct line and elevation as above described shall be placed a layer of Granular Base Course "Type A". After being placed and compacted, the granular base course shall have a minimum uniform thickness of base depth.

.3 Compaction requirements for granular base shall be as indicated on the Drawings and in accordance with Specification Section 31 23 00.

.4 Prior to the placing of the concrete, a vapour barrier of sub-grade paper or polyethylene film shall be placed on the prepared base. The polyethylene film shall be a minimum of 4 mm thick.

3.3 Formwork

.1 Forms shall be of wood or metal and of sufficient strength to resist springing, tipping or other displacement due to the placing of concrete and such other loads as may be superimposed during construction. Forms shall be free from warps, splits, holes and bulges and all bolts, rivets and fittings shall be countersunk.

.2 Forms shall be erected without the use of internal ties and shall be sufficiently tight to prevent leakage.

.3 Faces of forms against which concrete is to be placed shall, before the placing of concrete, be thoroughly cleaned and coated with an approved non staining oil or other approved material.

.4 Flexible or rigid forms of proper curvature may be used for curves having a radius of 30m or less. Division plates shall be metal.

.5 Forms when tested with a 3-metre straight edge or curved template shall not deviate on the top surface more than 3mm nor on the inside faces more than 6 mm from the testing edge of the template.

.6 Build formwork with joints sufficiently tight to prevent leakage of grout or cement paste. Install chamfers at external corners exposed to view where shown on the Drawings. Do not embed wood in concrete.

3.4 SUBGRADE AND SUBBASE PREPARATION

.1 Soft, yielding materials or other portions of subgrade that will not compact to specification shall be removed and replaced with suitable material. Subgrade to be brought to a firm unyielding condition with a uniform density. It shall be compacted at or above optimum moisture content to [95] % Standard Proctor density.

.2 When concrete is placed directly on subgrade, it will be checked for conformity with the cross-section tolerance. Finished surface shall not deviate more that 3 mm above and 10 mm below specified grade and cross-section, and the surface shall not deviate more than 10 mm at any place on a 3 mm template.

.3 Subbase to consist of specified material and have a compacted thickness of not less than specified.

.4 For slip-form paving, subbase travelled by tracks in paving machine shall be firm and have a smooth surface.

.5 Subbase shall be compacted to specified density.

.6 Prepared subbase shall be checked for conformity with the cross-section and grad tolerances. Finished surface of subbase shall not deviate more than 3 mm above and 10 mm below specified grade and cross-section, and surface shall not deviate more than 10 mm at any place on a 3 mm template.

.7 Repair damage to subbase resulting from hauling or equipment operations.

.8 Prior to placing concrete, subbase shall be thoroughly wetted. Wetting shall be carried out, such that standing water is not present on grade.

3.5 PLACING CONCRETE

.1 No concrete shall be placed until the forms and the base course on which the concrete is to be placed have been inspected by the Consultant.

.2 Coat formwork with form release agent before reinforcement and other built-in items are installed. Do not coat plywood forms pre-treated with release agent.

.3 The freshly mixed concrete shall be deposited on the sub-grade as close as possible to its final position, by methods which will prevent the separation or loss of the materials. The fresh concrete shall be thoroughly spaded along the sides of the forms and at all joints. Concrete shall be thoroughly consolidated in an approved manner to the full depth as soon as it has been placed.

.4 Use hand placing where machine spreading is not feasible.

.5 Spread uniformly with approved equipment to thickness sufficient to allow for proper consolidation and finishing. Do not apply external tractive force to paver.

.6 Operate with continuous forward momentum. Schedule concrete supply to minimize interruptions.

.7 When completing concrete placement for day, carry placement through to scheduled contraction joint location.

.8 Where concrete placement is stopped for more than 30 min due to breakdowns, weather or other reasons, construct extra bulkhead and construction joint as directed by Consultant.

.9 Equipment for chuting, pumping and pneumatically conveying concrete shall be of such size and design as to insure a practically continuous flow of concrete at the delivery end without separation of the materials. Maximum vertical drop from chutes shall be 1.5 metres.

.10 When placed in the forms, the concrete shall be tamped and struck off with a template riding on the side forms. The concrete should be placed a little high and the template must be sufficiently heavy to compress the concrete and bring it to the required elevation and slope.

.11 Concrete shall not be placed when the prepared sub-grade is frozen or when the sub-grade under the adjacent pavement is frozen. Concrete shall not be placed when the air temperature in the shade is 4.5 deg. C. or less and falling.

.12 No concrete shall be placed during rain.

.13 When rain appears imminent paving operation should cease. Protect freshly laid concrete from rain damage and adverse weather condition and in accordance with CSA A23.1/A23.2. Extend protective coverings over edges of concrete and arrange so as not to bear on unprotected edges.

.14 Concrete placed when the ambient temperature is at or above 27 degrees C to be cured by continuous water curing from soaker hoses providing complete coverage of the pavement to minimize the temperature rise of the concrete.

3.6 EXPANSION JOINTS

.1 Joints shall be formed with 13 mm thick full depth joint filler material types 'A' or 'C'.

.2 Panels shall be pre cut from a single piece to the shape of the cross section as shown in Drawings/Details, but so as to provide a 6mm recess on the exposed surfaces.

.3 Maximum spacing of expansion joints to be 4800 mm.

.4 Joints shall be formed with the materials as specified above. Joint filler panels shall be set in a vertical position.

.5 Work in close co-operation with other surface setting trades where this Work becomes integral with other materials. Adhere strictly to expansion and control joint patterns, where indicated.

3.7 ISOLATION JOINTS

.1 Install isolation joints around manholes and catch basins and along length adjacent to concrete curbs, catch basins, buildings, or permanent structure.

.2 Install joint filler in isolation joints as indicated.

.3 Seal isolation joints with sealant approved by Consultant.

3.8 CONTROL / CONSTRUCTION JOINTS

.1 Transverse weakened planed contraction joints shall be hand-formed. The joints may be hand-formed either by (1) using a narrow or triangular jointing tool or a thin metal blade to impress a place of weakness into the plastic concrete, or (2) inserting 3mm thick steel strips into the plastic concrete temporarily. Steel strips shall be withdrawn before final finishing of the concrete.

.2 For sidewalks:

.1 Contraction joints are to be placed so as to divide transversely into lengths of not more than 2000 mm. All edges shall be finished with a tool which produces a rounded edge and a smooth surface of not more than 50 mm in width and a 3 mm thick groove equal to at least one-quarter the depth of 50 mm at 2000 mm intervals. Width of cut shall be 3 mm.

.3 For sawn joints:

.1 Ensure joints are sawn straight. Install end stakes to ensure straight joint alignment across paved area. Mark joint alignment with chalk line or other suitable guide to approval of Consultant.

.2 Saw joints using approved equipment and methods to produce joint dimensions indicated.

.3 Make initial saw cuts in progressive manner and as soon as concrete surface has hardened sufficiently to resist ravelling as cut is made and before shrinkage cracks occurs.

3.9 FINISHING

.1 The concrete on the upper surface shall be floated with a wood or magnesium float only, to a smooth uniform finish to the required cross-section, free of open texturing, plucked aggregate and local projections.

.2 Care shall be taken to avoid over finishing or working more mortar to the surface than is actually required.

.3 Unless otherwise provided, back edges shall be rounded by use of a 6mm radius edging.

.4 Treat formed surfaces in accordance with CAN/CSA A23.1/A23.2-M, Clause 24 and as additionally specified herein.

.5 Unless otherwise indicated on the Drawings or herein, finish exposed surfaces of concrete paving with a medium sand-blast finish.

3.10 CURING, SEALING AND PROTECTION

.1 Cure concrete in accordance with CAN/CSA A23.1/A23.2-M, Clause 21 and as specified herein.

.2 White-pigmented curing compound shall not be used on any exposed concrete surfaces, unless specifically indicated on the Drawings or herein.

.3 Structural concrete is to be cured using wet burlap placed in two layers. Strips shall overlap by 150 mm. The burlap is to be kept continuously wet throughout the curing period. The burlap is to be pre-soaked for 24 hours prior to placing by immersing it in water.

.4 For concrete paving:

.1 As soon as concrete surface has been finished and can bear weight without marking, carefully cover with burlap or cotton mats.

.2 Place mats to overlap each other by 300 mm or more and to overlap concrete slab by 300 mm or more at each side secured by a continuous bank of sand and gravel.

.3 Cover sides and ends of slab with mats as soon as forms are removed.

.4 Thoroughly wet mats before placing them on concrete and keep saturated during curing period with water spray sufficiently fine to avoid damaging concrete surface, avoiding wet/dry cycles.

.5 Apply curing compound evenly to form a continuous film. Follow manufacturer's instructions.

.6 The Contractor shall always have materials available to protect the surface of the plastic concrete against rain. These materials shall consist of waterproof paper or plastic sheeting. For slipform construction, materials such as wood planks or forms to protect the edges shall also be required.

.7 When concrete is being placed in cold weather and the temperature may be expected to drop below 2 deg. C. suitable protection shall be provided to keep the concrete from freezing until it is at least 10 days old. Concrete injured by frost action shall be removed and replaced at the Contractor's expense.

3.11 BACKFILLING

.1 Allow concrete to cure 7 days prior to backfilling.

.2 The Contractor shall place earth shouldering at the edge of concrete works with an approved backfill material to grades approved by the Consultant.

3.12 PROTECTION OF THE PAVEMENT FROM TRAFFIC

.1 The Contractor shall by barricades, watchmen, or by other means, protect all concrete surfaces from harm by traffic until the Consultant authorizes the facility to be opened to public use.

.2 The Contractor shall at all times prior to the opening to traffic provide suitable bridging as other means of access to adjacent properties, but will only be required to do so at existing traffic points.

3.19 DEFECTIVE WORK, ADJUSTMENT AND CLEANING

.1 Replacement of Defective Work:

.1 Replace defective concrete Work to match balance of Work. Honeycombing, rough surfaces and other deficiencies will be replaced or repaired with mortar at the discretion of the Consultant. Plastering or rubbing down with a rich cement paste is not acceptable.

.2 Cleaning:

.1 Clean finish surfaces to remove stains, mortar, sealant and other foreign materials without damaging surfaces.

.3 Variations in excess of specified tolerances and marked or disfigured surfaces that cannot be repaired by approved methods will be considered defective Work performed by this section.

.4 Replace or modify concrete that is out of place or does not conform to lines, detail or grade as directed by the Consultant.

.5 Replace or repair defectively placed or finished concrete as directed by the Consultant.

.6 Shrinkage cracking caused by lack of shrinkage control, such as saw-cutting delay or lack of chemical control, will be replaced at the Contractor's expense.

3.20 REPAIRING & CLEANUP

3.20.1 The Contractor shall be held responsible for any damage or defacing done to the finished Work by other parties until the finished Work is accepted by the Consultant and shall repair or replace any damaged or defaced portion of the Work as required by the Consultant. The Contractor is required to provide adequate protection to ensure that fresh concrete is not vandalized.

END OF SECTION