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**SPECIFICATIONS**

**TORONTO COMMUNITY HOUSING**

**EXTERIOR ALTERATION OF TOWNHOUSES**

**15 Canlish Road, Toronto, Ontario**

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**Issued for Tender**

**May 7, 2019**

**RPL Project # 1612**

**DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS**

<b>Document</b>	<b>Title</b>	<b>Pages</b>
	Cover Page	1
00 01 10	Table of Contents	3
00 01 20	List of Schedules: Exterior Finishes Schedule	2

Procurement General Conditions for Contractors

**DIVISION 01 - GENERAL REQUIREMENTS**

<b>Section</b>	<b>Title</b>	<b>Pages</b>
01 11 00	Summary of Work	17
01 14 00	Work Restrictions	7
01 21 00	Allowances	1
01 23 00	Alternatives	1
01 29 00	Payment Procedures	2
01 30 00	Administrative Requirements	3
01 31 19	Project Meetings	4
01 32 16	Construction Project Schedule- Bar (Gantt) Chart	3
01 32 16.06	Construction Schedule	2
01 33 00	Submittal Procedures	13
01 35 29	Health and Safety Requirements	6
01 35 43	Environmental Procedures	1
01 41 00	Regulatory Requirements	2
01 45 00	Quality Control	8
01 51 00	Temporary Utilities	1
01 52 00	Temporary Construction Facilities	2
01 56 00	Temporary Barriers and Enclosures	1
01 61 00	Common Product Requirements	6
01 74 11	Cleaning	3
01 74 21	Waste Management and Disposal	4
01 77 00	Closeout Procedures	3
01 79 00	Demonstration and Training	2
01 91 00	General Commissioning Requirements	1

**DIVISION 02 – EXISTING CONDITIONS**

<b>Section</b>	<b>Title</b>	<b>Page</b>
02 06 00	Selective Demolition	7

**DIVISION 04 – MASONRY**

<b>Section</b>	<b>Title</b>	<b>Page</b>
04 20 00	Unit Masonry	13

**DIVISION 05 – METALS**

<b>Section</b>	<b>Title</b>	<b>Page</b>
05 50 00	Metal Fabrications	15

**DIVISION 06 – WOOD, PLASTICS AND COMPOSITES**

<b>Section</b>	<b>Title</b>	<b>Page</b>
06 10 12	Carpentry	10

**DIVISION 07 – THERMAL & MOISTURE PROTECTION**

<b>Section</b>	<b>Title</b>	<b>Page</b>
07 20 00	Insulation	10
07 27 00	Air / Vapour Barrier	17
07 42 00	Wall Panels	11
07 46 19	Steel Siding	14
07 48 13	Thermally Broken Rain Screen Attachment System	6
07 52 00	Membrane Roofing - SBS	33
07 62 00	Sheet Metal Flashing and Trim	12
07 90 00	Joint Sealing	14

**DIVISION 08 – OPENINGS**

<b>Section</b>	<b>Title</b>	<b>Page</b>
08 17 13	Entry Doors and Frames	17
08 36 13	Sectional Overhead Doors	10
08 42 00	Fibreglass Window	18
08 71 11	Finish Hardware	9

**DIVISION 09 – FINISHES**

<b>Section</b>	<b>Title</b>	<b>Page</b>
09 21 16	Gypsum Board Assemblies	10
09 91 00	Painting	21

**END OF SECTION**

**EXTERIOR MATERIALS/FINISHES:**

<b>REF.</b>	<b>MATERIAL</b>	<b>DETAILS</b>	<b>APPLICATION</b> (ref. Drawings & Room Finish Schedule)
C-1	Metal Coated Panel System	22ga brake-formed prefinished metal flashing trim; colour to match Pewter Metal Siding	Parapet cap flashings.
C-2	High Pressured Laminate	Manufacturer: Trespa Style: Hidden Fastener System, Colour: Brilliant Blue	To be applied at canopy, and soffit.
F-1	Metal Trim	22ga brake-formed prefinished metal flashing trim; colour to match Charcoal Metal Siding	Metal flashing trim and reveal joints.
F-2A	Metal Coated Panel System	Manufacturer: Vic West Style: Hidden Fastener System, 22ga, AD300-SR Vertical Cladding, Colour: Charcoal	Metal siding, refer to Typical Elevation Modules and Proposed Elevations.
F-2B	Metal Coated Panel System	Manufacturer: Vic West Style: Hidden Fastener System, 22ga, AD300-SR Vertical Cladding, Colour: Light Blue	Metal siding, refer to Typical Elevation Modules and Proposed Elevations.
F-2C	Metal Coated Panel System	Manufacturer: Vic West Style: Exposed Fastener System, 22ga, CL 6025-SR Vertical Cladding, Colour: Bright Silver	Metal siding, refer to Typical Elevation Modules and Proposed Elevations.
F-3	Concrete Faced Insulation Wall Panel	Manufacturer: T-Clear, LightGuard	~200mm base below all metal cladding, extend ~610mm below grade.
D-1 to D-5	Exterior Doors & Frames	Manufacturer: Inline Fiberglass Colour: Gentek Slate Charbon	Fibreglass exterior doors & frames.
W-1 to W-8	Exterior Windows & Frames	Manufacturer: Inline Fiberglass Colour: Gentek Slate Charbon	Fibreglass exterior windows & frames. Double glazed with Low-E coating.
EMS	Exterior Metal Sills	22ga brake-formed prefinished metal flashing trim; colour to match Gentek Slate Charbon.	On all exterior windows and door sidelight.
IWS	Interior Wood Enclosure	Finish: Stained maple wood	Interior enclosure around windows and doors. On all 4 sides of exterior windows and 3 sides of doors & sidelights.
GS-1	High Pressured Laminate	Manufacturer: Trespa, 10mm, Colour: Brilliant Blue	On front face of the Garbage Screen; secure to painted steel frames with exposed fasteners (powder coated, coloured to match panel, tamper resistant).
PT-1	Exterior Painting	Colour: Benjamin Moore, Charcoal	For all metal frames, railings, etc, to be painted / re-painted with rust-proof paint and primer
PT-2	Interior Painting	Colour: Benjamin Moore, as per TCHC standard colour	For all interior wall to be painted / re-painted, where the works involve interior, such as window and door replacement.

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RCS	Roofing Cap Sheet	Manufacturer: Firestone, 2-ply Modified Bitumen Cap Sheet Colour: Grey	Roofing cap sheet.
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Note: Contractor is required to submit samples of all materials in this schedule  
Refer to Exterior Elevation Drawings and Details.

**END OF SECTION**

## **1. GENERAL**

### **1.1 DESCRIPTION OF WORK INCLUDES**

- .1 The intent of the Contract Documents is that all labour, products and services necessary for the performance of the Work by the Contractor is provided in accordance with these documents. The Contractor shall provide all labour, materials and products that are required or normally recognized within respective trade practices as being necessary for the complete execution of the Work, and shall be responsible for such division of work amongst trades to ensure the work is complete.
- .2 Work of this Contract Documents comprises exterior alteration of the 5 existing buildings, comprising 55 residential townhouse units, located at 15 Canlish Road, Toronto, Ontario.
- .3 The residential units are two stories with basement and have an approximate footprint area of 2,995 m<sup>2</sup> (32,245 sf).
- .4 Interior work includes patching of drywall, trimming windows and doors with wood casing, caulking around window and door openings and painting on wall where new door and/or window are installed.
- .5 Scaffolding (designed and stamped by a Professional Engineer of Ontario) is required for both demolition and construction of townhouse units, as underground parking garage roof slab is not suitable for construction loading.
- .6 Overall project intent:
  - .1 Re-cladding, and/or over-cladding the existing townhouse walls, and roof replacement of the existing townhouse roofs, which will provide continuous thermal, moisture, and air control layers.
- .7 Work under this Contract Documents covers the following:
  - .1 Demolition work:
    - .1 For the purpose of structurally sound installation of the new cladding system, remove partly or in entirety the existing stucco and cementitious stucco, or as noted in the drawing.
    - .2 Stripping of the existing metal siding assembly up to the existing clay brick masonry.
  - .2 Patch and repair, to Consultant's satisfaction, any damage on the existing roofing, clay brick masonry, concrete masonry block, stucco, etc., as required, prior to the installation of the new cladding and roofing system.
  - .3 Replace the existing roof with the new roof at all residential townhouse unit blocks.
  - .4 Cladding replacement for all of the exterior walls of residential units to increase thermal performance and to reduce moisture / air leakage into the building.

- .5 Add new cladding on top of the existing stucco at the stair enclosures.
- .6 Remediation of 2 exterior concrete stairs (South and Middle).
- .7 Adding new hand-rails, remediation of the existing railings, and repainting.
- .8 Replacement of all above grade exterior windows, and doors.
- .9 Add new window opening, remove and re-clad existing windows at the trapezoid bedroom projections.
- .10 Add canopies above front entry doors.
- .11 Add garbage bin screens with posts and foundations beside entrance to units.
- .12 Add anti-freeze exterior hose bib at all residential townhouse units.
- .13 Add new electrical outlet on the exterior wall at the back of each residential unit.
- .14 Replace and organize existing services, including electrical conduits, cable TV's, rain water leaders, etc, on exterior face and roofs of buildings.
- .15 Add accommodation, as per drawings and specifications, for services: satellite antennas, window A/C units, etc.  
Note: Removal and re-instating of tenant's owned devices, such as: satellite antennas, window A/C units, etc., are not included in the Contract Documents (to be by tenants).
- .16 TCHC is to be involved for any movement of resident's equipment or property that may interfere with Contractor work.
- .17 Coordinate re-cladding works with the existing services such as hydro meter, gas meter, etc.
- .18 Coordinate with all service's providers/ utilities such as: Rogers, Bell, Enbridge, Toronto Hydro, etc, for any work related to or affecting those services.
- .19 Coordinate with Toronto Community Housing Vendors, such as: CCTV camera installation for any work related to or affecting their installations.
- .20 Accommodate and coordinate with authorities and service providers for the recladding work schedule and sequence. Contractor is to submit a schedule prior to any work around the services. General Contractor to provide protection to all exposed building components for safety.
- .21 Replace all exterior lightings, rain water leader, gutter, etc.
- .22 Remove and reinstate portions of existing exterior fencing and gates to facilitate recladding. Provide new sonotube foundation, filled with concrete at new fence post locations, close to the new cladding addition.
- .23 All other works as indicated on the drawings.
- .24 Provide 2 week look ahead schedule, including detail sequence of operation and

trade works, at least 2 weeks prior to work commencing, to TCHC Security Contractor and coordinate with TCHC Security. All works must be attended by TCHC Security Contractor.

- .25 Upon award, General Contractor is to provide a detailed Construction Schedule as outlined in Section 01 32 16.06. This schedule is to be updated every 2 weeks and circulated to Consultant, TCHC Project Representative, and TCHC Security Contractor for coordination with tenants. Tenants require minimum 2 week notice of any work affecting a unit.

## **1.2 RELATED SECTIONS**

- 01 11 00 – Summary of Work
- 01 14 00 – Work Restrictions
- 01 21 00 – Allowances
- 01 23 10 – Alternatives
- 01 29 00 – Payment Procedures
- 01 31 19 – Project Meetings
- 01 32 16 – Construction Project Schedule- Bar (Gantt) Chart
- 01 32 16.06 – Construction Schedule
- 01 33 00 – Submittal Procedures
- 01 35 29 – Health and Safety Requirements
- 01 35 43 – Environmental Procedures
- 01 41 00 – Regulatory Requirements
- 01 45 00 – Quality Control
- 01 51 00 – Temporary Utilities
- 01 52 00 – Temporary Construction Facilities
- 01 56 00 – Temporary Barriers and Enclosures
- 01 61 00 – Common Product Requirements
- 01 74 11 – Cleaning
- 01 74 21 – Waste Management and Disposal
- 01 77 00 – Close out Procedures
- 01 79 00 – Demonstration and Training
- 01 91 13 – General Commissioning Requirements

## **1.3 CONTRACTS**

- .1 Construction Work under single Stipulated Price Contract.



#### 1.4 PHASED CONTRACT SUMMARY

##### .1 Description of Project Phasing

Work of this Contract Documents is to be constructed in one phase:

- .1 Phase 1 MOCK UP– Building E (Unit # 43 – 49).

#### 1.5 WORK RESTRICTIONS

##### .1 Inclement Weather and Cold Weather Work

- .1 Take precautions during inclement weather and provide adequate protection to Work and construction materials from water damage.
- .2 Continue Work including winter months until Work is completed and accepted.
- .3 Inclement weather or extra work caused thereby shall not be considered valid reason for additional payment or delay in satisfactory conclusion of Work.

#### 1.6 WORK SEQUENCE

- .1 Construction Work in suitable manner to accommodate Toronto Community Housing Corporation herein referred to as TCHC, continuous use of premises during construction, as described below.
- .2 Cooperation with TCHC in scheduling operations to minimize conflict and to facilitate TCHC usage.
- .3 All of the Work is to proceed to the schedule submitted by the Contractor and accepted by the Owner. The Contractor's schedule will recognize the following restrictions:
- .4 The Contractor **must** perform his activities respecting the requirements set forth in the specifications Division 01 - Section 01 11 00 "Summary of Work" Paragraph 1.6 Occupancy and Use of Premises as will safeguard the operations of TCHC. All services are to be left in good repair and operating while the Work is undertaken.
- .5 The Contractor is to include for any hoarding, covered walkway, etc., necessary for this purpose. The construction activities are to be scheduled so as to minimize any complete shutdown of the townhouse and residential complex accessibility.
- .6 The building is completely operational at all times from:  
**Time:** 24 hours  
**Days:** Monday to Sunday
- .7 Electric welding from TCHC power source is **not** permitted.
- .8 The Contractor must abide by the Rules and Regulations of TCHC.

### 1.7 CONTRACTOR'S USE OF PREMISES

- .1 The Contractor shall maximize use of premises as much as possible to allow for:
  - .1 TCHC Occupancy.
  - .2 Resident's usage.
- .2 Assume full responsibility for protection from construction hazards of TCHC's staff and the public at all times when they are on the site.
- .3 Assume full responsibility for the protection of the existing buildings and landscaping from damage due to the Work of the Contractor or any Sub-contractors employed on the site. After obtaining the approval of the TCHC project Team, make good all damage to TCHC's satisfaction and at no cost to TCHC.
- .4 **Do not** encumber site with materials or equipment.
- .5 **Do not** load structure with weight that will endanger the structure.
- .6 Assume full responsibility for protection and safekeeping of products stored on premises.
- .7 Move any stored products or equipment which interfere with operations of TCHC at no cost to TCHC.
- .8 Temporary access points as may be required at the perimeter of the building shall be as later approved by TCHC.

### 1.8 OCCUPANCY AND USE OF BUILDING(S) PREMISES

- .1 The Contractor and all Sub-contractors are expected to understand that all areas of the building remain occupied during the Work and that the Work is to be executed in such a manner as to provide the minimum interference with the partial use of the premises by the occupants and the public, and the maximum safety of the occupants and the public during the Work. The Contractor and all Sub-contractors will take reasonable measures for the control of noise during Working hours.
- .2 All noise and vibrator generating operations, such as jack hammering, drilling, compacting and the use of other such equipment, that will interfere with the occupied portions of the building shall be confined to the hours between 09:00AM and 4:00PM.
- .3 The work shall be confined to the area defined on the drawings except that services connections and certain portions of landscaping, hard paving and curb work shall be executed on Municipal property under regulations of authorities having jurisdiction.
- .4 Assume responsibility for care, custody and control of site and perform work to extent covered in Contract Documents. Make good damage to site, to adjacent properties and to rights-of-way caused by Work of this Contract Documents.

- .5 Where the Contractor contemplates entering any occupied area of the premises to carry out Work or to obstruct or take out of use any occupied area of the existing occupied premises, he shall request a meeting with the TCHC Site Staff and Facilities Management in order to reach agreement as to the time, and length of time, he may possess, obstruct or remove from use any such area. No Work to existing occupied facilities shall be proceeded with until so authorized. Time for notice, limitations on rescheduling by Contractor
- .6 The Contractor may be requested from time to time to suspend certain objectionable operations causing undue interference with ongoing functions of the building.
- .7 It is essential that the existing building be maintained weather tight at all times. The Contractor shall therefore furnish all temporary protection, enclosures, tarpaulins, etc., as me be required to weatherproof any openings made by the Work. The Contractor and all Sub-contractors **must** seal off or temporarily dam all open roof edges, etc. to prevent any water present on existing roof areas, from entering the occupied floor(s).
- .8 It is essential that the existing building be maintained weather tight at all times. The Contractor shall therefore furnish all temporary protection, enclosures, tarpaulins, etc., as me be required to weatherproof any openings made by the Work. The Contractor and all Sub-contractors **must** seal off or temporarily dam all open roof edges, etc. to prevent any water present on existing roof areas, from entering the occupied floor(s).
- .9 The Contractor is to ensure that throughout the duration of the construction, the tenants and TCHC's power requirements **must not** be affected by the service of the construction.

#### **1.9 DISCREPANCIES/CONFLICTS/OMISSIONS**

- .1 If discrepancies or conflicts in, or omissions from Drawings, Specifications or other Contract Documents are suspected, or if there is doubt as to meaning or intent thereof, notify Consultant at once. Where there is conflict between Contract Documents, most stringent requirements shall prevail.
- .2 Drawings, Specifications and other Contract Documents are intended to be in compliance with federal, provincial and municipal laws, by-laws, regulations and other requirements of authorities having jurisdiction. Perform work in conformity with such requirements. If discrepancies, conflicts or omissions are suspected, notify Consultant at once.
- .3 Comply with Consultant's written instructions or explanations.
- .4 Contractor shall promptly, and not later than ten (10) working days of becoming aware of circumstances that may require a change in the Work or other directions, give written notice to Consultant outlining such circumstances and requesting written directions. Do

no work in affected area, or that would prevent Consultant from properly assessing situation or evaluating change, without prior written approval. Consultant will act promptly to give Contractor directions so Work is not unreasonably delayed.

### **1.10 FEES, PERMITS AND CERTIFICATES**

- .1 Provide authorities having jurisdiction with information requested.
- .2 Furnish certificates and permits.
- .3 Submit acceptable certificate stating that suspended ceiling systems provide adequate support for electrical fixtures, as required by current bulletin of Electrical Inspection Department of Ontario Hydro.
- .4 NOTE: Permit drawings are the property of the Owner. Contractor to forward "approved" permit drawings and a copy of the Building Permit to the Departmental Representative prior to the submission of the first request for progress payment.

### **2. SETTING OUT**

- 2.1 Lay out Work as shown on Drawings including all major grid and reference lines.
- 2.2 Verify grades, lines, levels and dimensions indicated and report any errors or inconsistencies to the Owner before commencing Work. Confirm job dimensions at once to allow prompt checking of shop and other drawings.
- 2.3 Locate and fix location of walls, partition, shafts and all parts of construction, as Work proceeds.

### **3. BUILDING DIMENSIONS**

- 3.1 Ensure that the necessary job dimensions are taken and Sub-contractors are coordinated for the proper execution of the Work. Assume complete responsibility for the accuracy and completeness of all dimensions, and for coordination of all elements of the Project.
- 3.2 Report any inconsistencies, ambiguities, discrepancies, omissions, and errors between Site conditions and Contract Documents to TCHC project team prior to the commencement of Work. If inconsistencies, ambiguities, discrepancies, omissions, and errors are not reported and clarified, the most stringent requirement shall govern, as determined by TCHC Construction representative.
- 3.3 Verify that Work, as it proceeds, is executed in accordance with dimensions and positions indicated which maintain levels and clearance to adjacent Work, as set out by

requirements of the Contract Documents, and ensure that Work installed in error is rectified without extra cost to TCHC before construction continues.

- 3.4 Check and verify dimensions referring to Work and interfacing of services. Dimensions, when pertaining to the Work of other Sections (Sub-contractors), shall be verified with the Section (Sub- contractor) concerned. Ensure that Sub-contractors performing various Sections cooperate for the proper performance of the Work.
- 3.5 **Do not** scale directly from the Drawings. If there is ambiguity or lack of information, immediately inform TCHC project team. Any change through the disregarding of this clause shall be the responsibility of the Contractor.
- 3.6 All details and measurements of any Work which is to fit or conform to Work installed shall be taken at the site.

#### **4. RECORDS**

- 4.1 Maintain a complete accurate log of control and survey Work as it progresses.
- 4.2 On request of the Owner, submit documentation to verify the accuracy of field engineering Work.

#### **5. MATERIALS AND PRODUCTS**

- 5.1 Work to be based on using new materials and products specified or indicated by reference to standards, codes, specifications, to a manufacturer's name, by trade name or by catalogue reference. Where two or more trade names are specified, the choice shall be optional with the Contractor.
- 5.2 The Contract Price to be based on materials and products specified.
- 5.3 Materials and products specified without the "or approved alternate" clause following the name of the materials or product to be supplied without substitution.
- 5.4 Where the Specifications include the "or approved alternate" clause substitutions will be considered by TCHC if:
  - .1 The materials and / or products specified are not available,
  - .2 Substitute products to those specified, which are brought to the attention of, and considered by, TCHC project Team after the Contract Award as "equivalent" to those specified will result in a credit to the Contract Price,
  - .3 Substitute products to those specified which are brought to the attention of, and considered by, TCHC project Team after the Contract Award as "superior" to those specified will result in a change to the Contract Price.

- 5.5 Substitutions may be proposed by the Sub-contractors after the Contract Award under the following conditions:
- .1 Proposed substitutions to show the material and product names and complete specifications and state what difference, if any, will be made to the Contract Price for each substitution, should it be accepted.
  - .2 Should the proposed substitution be accepted either in part or in whole, the Contractor will assume full responsibility when the substitution affects any other Work or Work of other Sections (Sub-contractors). Drawing changes required as a result of the substitution will be executed by the Consultant at the Contractor's expense.
  - .3 Proposed substitutions **must** satisfy all design conditions and other specified requirements. Properties included but not limited to the following as applicable, will be considered:
    1. Finish,
    2. Durability,
    3. Warranty,
    4. Performance,
    5. Physical dimension requirements must satisfy the space limitations,
    6. Static and dynamic weight limitations,
    7. Structural properties,
    8. Audible noise levels,
    9. Vibration generation,
    10. Interchangeability of parts and / or components,
    11. Accessibility for maintenance,
    12. Possible removal or replacement,
    13. Colours,
    14. Textures,
    15. Compatibility with other materials, products, assemblies and components.
- 5.6 The cost of changes in the Work of a Sub-contract necessitated by the use of proposed material and / or product substitution is to be borne by the Sub-contractor proposing the substitution.

## 6. METHODS OR PROCESSES

- 6.1 The Contractor may suggest, for the consideration of the TCHC project Team, substitutions to methods or processes described in the Specifications and / or shown on the Drawings. Any application for such substitutions **must** indicate how such

substitutions are advantageous to the Owner or to the better fulfillment of the Contract Documents. There shall be no obligation on the parties concerned to accept any such suggestions. Requests for alternatives **must** be made in duplicate and be accompanied by catalogue cuts, specifications and methods of installation.

- 6.2 The Contractor will be responsible for substitutions to methods or processes concerning such Work, and the warranty covering all parts of the Work shall **not** be affected.
- 6.3 The cost of all changes in the Work of other Sections (Sub-contractors) necessitated by the use of substituted methods or processes, is to be borne by the Section (Sub-contractor) proposing the substitution.
- 6.4 Said methods or processes **must** fit into the space allotted for the specified methods or processes.

## **7. CREDITS ARISING FROM SUBSTITUTIONS**

- 7.1 Any and all credits arising from the substitutions mentioned will be credited to the Sub-contract in such sums as may be assessed by TCHC project Team and the Sub-Contract Price will be adjusted accordingly. No substitutions will be permitted without the prior written approval of the TCHC project Team.

## **8. CODE REQUIREMENTS**

- 8.1 Proposed substitutions for materials, products, methods and processes shall meet the requirements of the Ontario Building Code 2006, as amended, and the regulations, by-laws and municipal statutes of authorities having jurisdiction including the latest amendments thereto.
- 8.2 Proposed substitution materials, products, methods and processes **must not** negate the compliance of adjacent materials, products and constructions with the requirements of the Ontario Building Code 2012, as amended, and the regulations, by-laws and municipal statutes of authorities having jurisdiction including the latest amendments thereto, and special bulletins, to which the proposed substitutions may be applied or attached.

## **9. SUPPLEMENTARY DEFINITIONS**

- 9.1 In the Specifications, references such as “shown on the Drawings”, “specified”, “scheduled”, “called for” and the like shall be deemed to include Work required by any of the Contract Documents.

- 9.2 In the Specifications the expression Section(s) is synonymous with Sub-contractor(s) if the context permits. The expression "all Sections" shall be deemed to include the Contractor.

#### **10. MATERIAL HANDLING AND STORAGE**

- 10.1 Store packaged material in original, undamaged containers with manufacturer's labels and seals intact.
- 10.2 Store sand, masonry units and manufactured items off ground on approved supports and protect each pile with weatherproof covering. Stack to permit air circulation and to prevent damage to units. Use mechanical equipment for handling to minimize damage.
- 10.3 Prevent damage to materials during handling and storage.
- 10.4 Damaged materials are **not** acceptable. Remove damaged or rejected material from site immediately at the Contractor's or Sub-contractor's expense.

#### **11. LINTELS AND BRIDGING**

- 11.1 Ensure correct formation and bridging of openings in masonry and structural walls required by the Sections (Sub-contractors). Conform to lintel requirements shown on Structural Drawings and Standard Details.

#### **12. TEMPORARY WORK**

- 12.1 The expression "provide" shall be deemed to include the provision, installation and finishing, maintenance, servicing and removal of the Work described. All Work damaged by temporary installations shall be repaired and made good at no expense to TCHC.

#### **13. EXAMINATION**

- 13.1 Each Section (Sub-contractor) shall examine surfaces prepared by other Sections (Sub-contractors) which affect its Work and shall ensure that defects are corrected. Commencement of Work shall imply acceptance of prepared Work.
- 13.2 All Sections (Sub-contractors) shall check and verify with the Contractor all dimensions, especially those pertaining to Work of more than just their Section (Sub-contractors Work).
- 13.3 All details and measurements of any Work which is to fit to, or conform with, Work already installed by other Sections (Sub-contractors, shall be taken at the job site by the Sections (Sub-contractors) concerned.



#### **14. SUPPLY AND / OR INSTALLATION**

- 14.1 Unless the word “only” suffixes “supply” or “install” or other variations of those words according to the Section wherein they are used, it is the express intent of this Contract Document that “supply and install” is implied.
- 14.2 Unless otherwise specified, Work shall be installed in accordance with the manufacturer’s printed directions and recommendations.

#### **15. SATISFACTION / APPROVAL**

- 15.1 The expression “to the satisfaction or approval of the Owner” shall be implied throughout the Specifications in regard to all materials and Workmanship.
- 15.2 “Submit for approval” means that the item in question is to be submitted to the Owner for approval and that a written acceptance of it is authorization for its use in the Work shall be obtained before it is incorporated in the Work. Sections (Sub-contractors) shall submit items for approval to the Owner via the Contractor.
- 15.3 An “approved Method” means that which has the manufacturer’s recommendation or which is generally accepted as good trade practice. The Owner’s approval is also required.

#### **16. FASTENINGS**

- 16.1 Use exposed metal fastenings and accessories of a permanent type that are of same texture, colour and finish as the base metal on which they occur.
- 16.2 Use metal fastening of the same material as the metal component they are anchoring or of a metal which will not set up an electrolytic action which would cause damage to the fastening and / or metal component.
- 16.3 Use fastenings of a type and size and install them in a manner to provide positive permanent anchorage of the unit to be anchored in position. Install anchors at required spacing to provide required load bearing or shear capacity.
- 16.4 Keep exposed fastenings to a minimum, evenly spaced and neatly laid out. Show on shop drawings.
- 16.5 Fastenings which cause spalling or cracking of material to which anchorage is being made are not permitted.
- 16.6 Limitations for use of Power Actuated Tools:

- .1 The use of powder activated fasteners is prohibited without the written authorization of the TCHC.
- .2 Where such authority is given, it will be for low velocity type powder activated fasteners and for horizontal application only.
- .3 The manufacturer of the equipment selected, Ramset, shall send a representative to site to demonstrate the equipment prior to its use, and this representative shall make periodic inspections to ensure compliance with instructions issued by him and correct application of material. In all cases a shield shall be used where fasteners are applied to concrete. The use of fasteners in precast concrete is to be avoided if possible as there is an increased tendency to shatter surfaces.
- .4 Fasteners shall not be nearer than 2.5 inches (65 mm) to the edge of any precast or cast-in- place formed concrete member.
- .5 Under no circumstances shall fasteners be used on concrete members less than 3 inches (75 mm) in thickness, or in brick or unit masonry.
- .6 Such fasteners shall not be used in areas where corrosion can take place, for instance due to high humidity or condensation.
- .7 Generally, use support anchorage of cast-in-place type set into concrete forms prior to pouring concrete, or self-drilling type such as Phillips "Red Head" T-32 tie wire type. When drilling upwards, use jig to hold drill steady and plumb.
- .8 Provide pull-out tests on anchors, or otherwise test to ensure anchorage is sufficient for particular application including a minimum safety factor of seven. Provide evidence of such tests if requested.
- .9 Submit samples of proposed anchoring or hanging devices with technical data and test data.

## 17. EXISTING SERVICES

- 17.1 The Contractor is responsible for ensuring all "Existing Services" (including but not limited to structural elements, water pipes, drains, electrical cables and fixtures, communications cables and fixtures, security cables and fixtures, HVAC ducting, cables and fixtures, etc.) are not interrupted and / or damaged by the Construction Work. The Contractor must take all precautions to ensure that services buried underground or contained in a floor or contained in other elements are identified on the drawings provided by TCHC and have been clearly identified on the Work Site.
- 17.2 TCHC will not be liable for any loss, damage, delay or claim whatsoever resulting or arising from the absence in whole or part of services **not** shown on drawings.

## 18. EMERGENCIES

- 18.1 Notify TCHC project Team immediately should an emergency arise on the site, including personal injuries and accidents. Provide complete details on extent of emergency, cause and the action being taken. This notification shall be by telephone, text, or email immediately after the occurrence.

## 19. FIELD MARKING

- 19.1 **Do not** use wick pen to mark face of products to be installed in the Work. Such pen marks may show through applied paint or vinyl coatings and the like in due course. The Contractor will be held responsible and required to remedy such defects, classified as “latent defects” regardless of when they occur.

## 20. TRADEMARKS AND LABELS

- 20.1 Trademarks and labels, including applied labels shall not be visible in the finished Work. Such trademarks or labels shall be removed by grinding if necessary, or painted out where the particular material has been painted.
- 20.2 The exception of this requirement shall be those essential to obtain identification of mechanical and electrical equipment and those required to be visible by authorities having jurisdiction and those on plumbing fixtures and trims.

## 21. SAFETY

- 21.1 The Contractor is to be solely responsible for safety on site and for the compliance with all codes, regulations and laws of all authorities having jurisdiction.

## 22. EXISTING SURFACES

- 22.1 All surfaces to receive a new finish are to be properly prepared to receive the new finish supplied. All implementations to be repaired to ensure that blemishes **do not** telegraph through the new finish.
- 22.2 The term “Make Good” shall mean repairing or filling operations performed on existing floors, walls, ceilings or any other exposed surfaces. It is intended that finished surfaces match and line with adjoining surfaces.
- 22.3 “Make Good” all surfaces and finishes disturbed or damaged due to Work of this Contract Documents to match existing or adjoining surfaces. Ensure the materials used to repair the damage are compatible with the existing materials and work.

- 22.4 The Site **must** be restored to a condition equal to the existing conditions or, if specified elsewhere, to a condition better than the existing conditions.
- 22.5 Restore lands outside of the limits of the Work, which are disturbed or damaged due to the Work to their original condition in addition to complying with the requirements of the General Conditions of the Form of Agreement.

### **23. SUB-DIVISION OF WORK**

#### 23.1 Specification format and Contractor's responsibility for coordination of sub-contractors:

##### .1 Cooperation

1. Provide forms, templates, anchors, sleeves, inserts and accessories required to be fixed to or inserted into Work and set in place or instruct separate Sections (Sub-contractors) as to their locations.
2. Supply items to be "Built-In" as and when required together with templates, measurements, shop drawings and other related information and assistance.
3. Pay the cost of extra Work and make up time lost as a result of failure to provide necessary information and items to be "Built-In" in adequate time.

##### .2 Coordination

1. Ensure that Sections (Sub-contractors) cooperate with each other so that Work will be carried out expeditiously and will be satisfactory in all respects at completion.
2. Ensure that Sections (Sub-contractors) examine Contract Documents with particular emphasis to Work of other Sections (Sub-contractors) which may affect the performance of their own Work.
3. Ensure Sections (Sub-contractors) cooperate with other Sections (Sub-contractors) whose Work attaches to or is affected by their own Work, and ensure that minor adjustments are made to make adjustable Work fit to fixed Work.
4. Ensure that Sections (Sub-contractors) requiring foundations or openings to be left for the installation of their Work furnish the necessary information to the Sections (Sub-contractors) concerned in ample time so that proper provisions can be made.
5. Ensure that items to be "Built-In" are supplied as and when required by Sections (Sub-contractors) building in the items together with templates, measurements or shop drawings and other related information and assistance.
6. Ensure coordination of products supplied in metric and imperial units into the overall layout.
7. Under no circumstances will any extra payment be allowed due to the failure by the Trade Contractor to coordinate the Work. If required, in critical locations, prepare

interference and/or installation drawings showing the work of the various Sections as well as the existing installation, and submit these drawings to TCHC project Team and Consultant for review before the commencement of Work.

#### **24. CUTTING AND PATCHING**

- 24.1 The expression “make good”, refers to repair and restoration of both new and existing Work.
- 24.2 **Do not** cut, bore or sleeve load bearing members without first obtaining Consultant’s written authority for each condition, unless specifically shown and noted on Drawings.
- 24.3 Cut holes after they are located and sized by applicable Sections (Sub-contractors) requiring holes.
- 24.4 Have cutting and patching done by the Section (Sub-contractor) involved, e.g. have holes in masonry cut and patched by the mason. However, the Contractor shall be responsible for all cutting and remedial Work that is shown upon, or reasonably implied by the Contract Documents.
- 24.5 Make cuts with clean, true, smooth edges. Fit units to tolerances established for best standard practice for applicable Work. Make patches as inconspicuous as possible in final assembly.
- 24.6 Be responsible for correct formation and bridging of openings in masonry and structural walls required by other Sections (Sub-contractors).
- 24.7 Ensure compatibility between installed materials and security of installation.

#### **25. OTHER CONTRACTORS**

- 25.1 The Contractor is responsible to correlate and coordinate all Work with that of other Contractors having separate contracts with the owner or the TCHC in order to complete the Work as expeditiously as possible.
- 25.2 Prior to commencement of Work ensure that all Sections (Sub-contractors) are fully conversant with the extent of the Work, the conditions and materials on the project, the schedule of completion, restrictions to safety, and access.
- 25.3 Inform all Sections (Sub-contractors) that each is responsible for checking all Sections of the specification for Work pertaining to their Section (Sub-contractor’s Work).

#### **26. EXTENDED WARRANTY**

- 26.1 All warranties, including the required standard one year warranty, shall start at the date of publication of Substantial Performance of the Total Contract, or when Work of an

area is substantially completed, accepted and taken over for use by the TCHC. Ensure that all warranties comply with this stipulation prior to submission of same.

- 26.2 TCHC shall give prompt notice in writing to the Consultant and the Contractor of any defects noted during the warranty period(s), promptly requesting them to remedy such defects.
- 26.3 During the month prior to the end of the standard one year warranty period, TCHC, the Consultant and the Contractor, shall conduct an inspection of the project, the Contractor shall promptly remedy any defects due to faulty materials or Workmanship.
- 26.4 At the expiry of the standard one year warranty period the Contractor shall formally assign to TCHC all extended warranties given by Sub-contractors for their Work on the project and such Sub- contractors shall formally be advised of the assignment.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 DESCRIPTION OF WORK INCLUDES**

- .1 The intent of the Contract Documents is that all labour, products and services necessary for the performance of the Work by the Contractor is provided in accordance with these documents. The Contractor shall provide all labour, materials and products that are required or normally recognized within respective trade practices as being necessary for the complete execution of the Work, and shall be responsible for such division of work amongst trades to ensure the work is complete.
- .2 Work of this Contract Documents comprises exterior alteration of the 5 existing buildings, comprising 55 residential townhouse units, located at 15 Canlish Road, Toronto, Ontario.
- .3 The residential units are two stories with basement and have an approximate footprint area of 2,995 m<sup>2</sup> (32,245 sf).
- .4 Interior work includes patching of drywall, trimming windows and doors with wood casing, caulking around window and door openings and painting on wall where new door and/or window are installed.
- .5 Scaffolding (designed and stamped by a Professional Engineer of Ontario) is required for both demolition and construction of townhouse units, as underground parking garage roof slab is not suitable for construction loading.
- .6 Overall project intent:
  - .1 Re-cladding, and/or over-cladding the existing townhouse walls, and roof replacement of the existing townhouse roofs, which will provide continuous thermal, moisture, and air control layers.
- .7 Work under this Contract Documents covers the following:
  - .1 Demolition work:
    - .1 For the purpose of structurally sound installation of the new cladding system, remove partly or in entirety the existing stucco and cementitious stucco, or as noted in the drawing.
    - .2 Stripping of the existing metal siding assembly up to the existing clay brick masonry.
  - .2 Patch and repair, to Consultant's satisfaction, any damage on the existing roofing, clay brick masonry, concrete masonry block, stucco, etc., as required, prior to the installation of the new cladding and roofing system.
  - .3 Replace the existing roof with the new roof at all residential townhouse unit blocks.
  - .4 Cladding replacement for all of the exterior walls of residential units to increase thermal performance and to reduce moisture / air leakage into the building.

- .5 Add new cladding on top of the existing stucco at the stair enclosures.
- .6 Remediation of 2 exterior concrete stairs (South and Middle).
- .7 Adding new hand-rails, remediation of the existing railings, and repainting.
- .8 Replacement of all above grade exterior windows, and doors.
- .9 Add new window opening, remove and re-clad existing windows at the trapezoid bedroom projections.
- .10 Add canopies above front entry doors.
- .11 Add garbage bin screens with posts and foundations beside entrance to units.
- .12 Add anti-freeze exterior hose bib at all residential townhouse units.
- .13 Add new electrical outlet on the exterior wall at the back of each residential unit.
- .14 Replace and organize existing services, including electrical conduits, cable TV's, rain water leaders, etc, on exterior face and roofs of buildings.
- .15 Add accommodation, as per drawings and specifications, for services: satellite antennas, window A/C units, etc.  
Note: Removal and re-instating of tenant's owned devices, such as: satellite antennas, window A/C units, etc., are not included in the Contract Documents (to be by tenants).
- .16 TCHC is to be involved for any movement of resident's equipment or property that may interfere with Contractor work.
- .17 Coordinate re-cladding works with the existing services such as hydro meter, gas meter, etc.
- .18 Coordinate with all service's providers/ utilities such as: Rogers, Bell, Enbridge, Toronto Hydro, etc, for any work related to or affecting those services.
- .19 Coordinate with Toronto Community Housing Vendors, such as: CCTV camera installation for any work related to or affecting their installations.
- .20 Accommodate and coordinate with authorities and service providers for the recladding work schedule and sequence. Contractor is to submit a schedule prior to any work around the services. General Contractor to provide protection to all exposed building components for safety.
- .21 Replace all exterior lightings, rain water leader, gutter, etc.
- .22 Remove and reinstate portions of existing exterior fencing and gates to facilitate recladding. Provide new sonotube foundation, filled with concrete at new fence post locations, close to the new cladding addition.
- .23 All other works as indicated on the drawings.
- .24 Provide 2 week look ahead schedule, including detail sequence of operation and



trade works, at least 2 weeks prior to work commencing, to TCHC Security Contractor and coordinate with TCHC Security. All works must be attended by TCHC Security Contractor.

- .25 Upon award, General Contractor is to provide a detailed Construction Schedule as outlined in Section 01 32 16.06. This schedule is to be updated every 2 weeks and circulated to Consultant, TCHC Project Representative, and TCHC Security Contractor for coordination with tenants. Tenants require minimum 2 week notice of any work affecting a unit.

## **1.2 RELATED SECTIONS**

- 01 11 00 – Summary of Work
- 01 14 00 – Work Restrictions
- 01 21 00 – Allowances
- 01 23 10 – Alternatives
- 01 29 00 – Payment Procedures
- 01 31 19 – Project Meetings
- 01 32 16 – Construction Project Schedule- Bar (Gantt) Chart
- 01 32 16.06 – Construction Schedule
- 01 33 00 – Submittal Procedures
- 01 35 29 – Health and Safety Requirements
- 01 35 43 – Environmental Procedures
- 01 41 00 – Regulatory Requirements
- 01 45 00 – Quality Control
- 01 51 00 – Temporary Utilities
- 01 52 00 – Temporary Construction Facilities
- 01 56 00 – Temporary Barriers and Enclosures
- 01 61 00 – Common Product Requirements
- 01 74 11 – Cleaning
- 01 74 21 – Waste Management and Disposal
- 01 77 00 – Close out Procedures
- 01 79 00 – Demonstration and Training
- 01 91 13 – General Commissioning Requirements

## **1.3 CONTRACTS**

- .1 Construction Work under single Stipulated Price Contract.

#### 1.4 PHASED CONTRACT SUMMARY

##### .1 Description of Project Phasing

Work of this Contract Documents is to be constructed in two phases:

- .1 Phase 1 – Building B (Unit # 7 – 25).
- .2 Phase 2 – Building A, C, D (Unit # 1 – 6, # 26 – 35, # 36 – 42).
- .3 Phase 3 – Building E (Unit # 43 – 56).

#### 1.5 WORK RESTRICTIONS

##### .1 Inclement Weather and Cold Weather Work

- .1 Take precautions during inclement weather and provide adequate protection to Work and construction materials from water damage.
- .2 Continue Work including winter months until Work is completed and accepted.
- .3 Inclement weather or extra work caused thereby shall not be considered valid reason for additional payment or delay in satisfactory conclusion of Work.

#### 1.6 WORK SEQUENCE

- .1 Construction Work in suitable manner to accommodate Toronto Community Housing Corporation herein referred to as TCHC, continuous use of premises during construction, as described below.
- .2 Cooperation with TCHC in scheduling operations to minimize conflict and to facilitate TCHC usage.
- .3 All of the Work is to proceed to the schedule submitted by the Contractor and accepted by the Owner. The Contractor's schedule will recognize the following restrictions:
- .4 The Contractor **must** perform his activities respecting the requirements set forth in the specifications Division 01 - Section 01 11 00 "Summary of Work" Paragraph 1.6 Occupancy and Use of Premises as will safeguard the operations of TCHC. All services are to be left in good repair and operating while the Work is undertaken.
- .5 The Contractor is to include for any hoarding, covered walkway, etc., necessary for this purpose. The construction activities are to be scheduled so as to minimize any complete shutdown of the townhouse and residential complex accessibility.
- .6 The building is completely operational at all times from:  
**Time:** 24 hours  
**Days:** Monday to Sunday
- .7 Electric welding from TCHC power source is **not** permitted.
- .8 The Contractor must abide by the Rules and Regulations of TCHC.

## 1.7 CONTRACTOR'S USE OF PREMISES

- .1 The Contractor shall maximize use of premises as much as possible to allow for:
  - .1 TCHC Occupancy.
  - .2 Resident's usage.
- .2 Assume full responsibility for protection from construction hazards of TCHC's staff and the public at all times when they are on the site.
- .3 Assume full responsibility for the protection of the existing buildings and landscaping from damage due to the Work of the Contractor or any Sub-contractors employed on the site. After obtaining the approval of the TCHC project Team, make good all damage to TCHC's satisfaction and at no cost to TCHC.
- .4 **Do not** encumber site with materials or equipment.
- .5 **Do not** load structure with weight that will endanger the structure.
- .6 Assume full responsibility for protection and safekeeping of products stored on premises.
- .7 Move any stored products or equipment which interfere with operations of TCHC at no cost to TCHC.
- .8 Temporary access points as may be required at the perimeter of the building shall be as later approved by TCHC.

## 1.8 OCCUPANCY AND USE OF BUILDING(S) PREMISES

- .1 The Contractor and all Sub-contractors are expected to understand that all areas of the building remain occupied during the Work and that the Work is to be executed in such a manner as to provide the minimum interference with the partial use of the premises by the occupants and the public, and the maximum safety of the occupants and the public during the Work. The Contractor and all Sub-contractors will take reasonable measures for the control of noise during Working hours.
- .2 All noise and vibrator generating operations, such as jack hammering, drilling, compacting and the use of other such equipment, that will interfere with the occupied portions of the building shall be confined to the hours between 09:00AM and 4:00PM.
- .3 The work shall be confined to the area defined on the drawings except that services connections and certain portions of landscaping, hard paving and curb work shall be executed on Municipal property under regulations of authorities having jurisdiction.
- .4 Assume responsibility for care, custody and control of site and perform work to extent covered in Contract Documents. Make good damage to site, to adjacent properties and to rights-of-way caused by Work of this Contract Documents.
- .5 Where the Contractor contemplates entering any occupied area of the premises to carry

- out Work or to obstruct or take out of use any occupied area of the existing occupied premises, he shall request a meeting with the TCHC Site Staff and Facilities Management in order to reach agreement as to the time, and length of time, he may possess, obstruct or remove from use any such area. No Work to existing occupied facilities shall be proceeded with until so authorized. Time for notice, limitations on rescheduling by Contractor
- .6 The Contractor may be requested from time to time to suspend certain objectionable operations causing undue interference with ongoing functions of the building.
  - .7 It is essential that the existing building be maintained weather tight at all times. The Contractor shall therefore furnish all temporary protection, enclosures, tarpaulins, etc., as me be required to weatherproof any openings made by the Work. The Contractor and all Sub-contractors **must** seal off or temporarily dam all open roof edges, etc. to prevent any water present on existing roof areas, from entering the occupied floor(s).
  - .8 It is essential that the existing building be maintained weather tight at all times. The Contractor shall therefore furnish all temporary protection, enclosures, tarpaulins, etc., as me be required to weatherproof any openings made by the Work. The Contractor and all Sub-contractors **must** seal off or temporarily dam all open roof edges, etc. to prevent any water present on existing roof areas, from entering the occupied floor(s).
  - .9 The Contractor is to ensure that throughout the duration of the construction, the tenants and TCHC's power requirements **must not** be affected by the service of the construction.

## 1.9 DISCREPANCIES/CONFLICTS/OMISSIONS

- .1 If discrepancies or conflicts in, or omissions from Drawings, Specifications or other Contract Documents are suspected, or if there is doubt as to meaning or intent thereof, notify Consultant at once. Where there is conflict between Contract Documents, most stringent requirements shall prevail.
- .2 Drawings, Specifications and other Contract Documents are intended to be in compliance with federal, provincial and municipal laws, by-laws, regulations and other requirements of authorities having jurisdiction. Perform work in conformity with such requirements. If discrepancies, conflicts or omissions are suspected, notify Consultant at once.
- .3 Comply with Consultant's written instructions or explanations.
- .4 Contractor shall promptly, and not later than ten (10) working days of becoming aware of circumstances that may require a change in the Work or other directions, give written notice to Consultant outlining such circumstances and requesting written directions. Do no work in affected area, or that would prevent Consultant from properly assessing

situation or evaluating change, without prior written approval. Consultant will act promptly to give Contractor directions so Work is not unreasonably delayed.

#### **1.10 FEES, PERMITS AND CERTIFICATES**

- .1 Provide authorities having jurisdiction with information requested.
- .2 Furnish certificates and permits.
- .3 Submit acceptable certificate stating that suspended ceiling systems provide adequate support for electrical fixtures, as required by current bulletin of Electrical Inspection Department of Ontario Hydro.
- .4 NOTE: Permit drawings are the property of the Owner. Contractor to forward "approved" permit drawings and a copy of the Building Permit to the Departmental Representative prior to the submission of the first request for progress payment.

#### **2. SETTING OUT**

- 2.1 Lay out Work as shown on Drawings including all major grid and reference lines.
- 2.2 Verify grades, lines, levels and dimensions indicated and report any errors or inconsistencies to the Owner before commencing Work. Confirm job dimensions at once to allow prompt checking of shop and other drawings.
- 2.3 Locate and fix location of walls, partition, shafts and all parts of construction, as Work proceeds.

#### **3. BUILDING DIMENSIONS**

- 3.1 Ensure that the necessary job dimensions are taken and Sub-contractors are coordinated for the proper execution of the Work. Assume complete responsibility for the accuracy and completeness of all dimensions, and for coordination of all elements of the Project.
- 3.2 Report any inconsistencies, ambiguities, discrepancies, omissions, and errors between Site conditions and Contract Documents to TCHC project team prior to the commencement of Work. If inconsistencies, ambiguities, discrepancies, omissions, and errors are not reported and clarified, the most stringent requirement shall govern, as determined by TCHC Construction representative.
- 3.3 Verify that Work, as it proceeds, is executed in accordance with dimensions and positions indicated which maintain levels and clearance to adjacent Work, as set out by requirements of the Contract Documents, and ensure that Work installed in error is rectified without extra cost to TCHC before construction continues.

- 3.4 Check and verify dimensions referring to Work and interfacing of services. Dimensions, when pertaining to the Work of other Sections (Sub-contractors), shall be verified with the Section (Sub- contractor) concerned. Ensure that Sub-contractors performing various Sections cooperate for the proper performance of the Work.
- 3.5 **Do not** scale directly from the Drawings. If there is ambiguity or lack of information, immediately inform TCHC project team. Any change through the disregarding of this clause shall be the responsibility of the Contractor.
- 3.6 All details and measurements of any Work which is to fit or conform to Work installed shall be taken at the site.

#### **4. RECORDS**

- 4.1 Maintain a complete accurate log of control and survey Work as it progresses.
- 4.2 On request of the Owner, submit documentation to verify the accuracy of field engineering Work.

#### **5. MATERIALS AND PRODUCTS**

- 5.1 Work to be based on using new materials and products specified or indicated by reference to standards, codes, specifications, to a manufacturer's name, by trade name or by catalogue reference. Where two or more trade names are specified, the choice shall be optional with the Contractor.
- 5.2 The Contract Price to be based on materials and products specified.
- 5.3 Materials and products specified without the "or approved alternate" clause following the name of the materials or product to be supplied without substitution.
- 5.4 Where the Specifications include the "or approved alternate" clause substitutions will be considered by TCHC if:
  - .1 The materials and / or products specified are not available,
  - .2 Substitute products to those specified, which are brought to the attention of, and considered by, TCHC project Team after the Contract Award as "equivalent" to those specified will result in a credit to the Contract Price,
  - .3 Substitute products to those specified which are brought to the attention of, and considered by, TCHC project Team after the Contract Award as "superior" to those specified will result in a change to the Contract Price.
- 5.5 Substitutions may be proposed by the Sub-contractors after the Contract Award under the following conditions:
  - .1 Proposed substitutions to show the material and product names and complete

- specifications and state what difference, if any, will be made to the Contract Price for each substitution, should it be accepted.
- .2 Should the proposed substitution be accepted either in part or in whole, the Contractor will assume full responsibility when the substitution affects any other Work or Work of other Sections (Sub-contractors). Drawing changes required as a result of the substitution will be executed by the Consultant at the Contractor's expense.
- .3 Proposed substitutions **must** satisfy all design conditions and other specified requirements. Properties included but not limited to the following as applicable, will be considered:
1. Finish,
  2. Durability,
  3. Warranty,
  4. Performance,
  5. Physical dimension requirements must satisfy the space limitations,
  6. Static and dynamic weight limitations,
  7. Structural properties,
  8. Audible noise levels,
  9. Vibration generation,
  10. Interchangeability of parts and / or components,
  11. Accessibility for maintenance,
  12. Possible removal or replacement,
  13. Colours,
  14. Textures,
  15. Compatibility with other materials, products, assemblies and components.
- 5.6 The cost of changes in the Work of a Sub-contract necessitated by the use of proposed material and / or product substitution is to be borne by the Sub-contractor proposing the substitution.

## **6. METHODS OR PROCESSES**

- 6.1 The Contractor may suggest, for the consideration of the TCHC project Team, substitutions to methods or processes described in the Specifications and / or shown on the Drawings. Any application for such substitutions **must** indicate how such substitutions are advantageous to the Owner or to the better fulfillment of the Contract Documents. There shall be no obligation on the parties concerned to accept any such

suggestions. Requests for alternatives **must** be made in duplicate and be accompanied by catalogue cuts, specifications and methods of installation.

- 6.2 The Contractor will be responsible for substitutions to methods or processes concerning such Work, and the warranty covering all parts of the Work shall **not** be affected.
- 6.3 The cost of all changes in the Work of other Sections (Sub-contractors) necessitated by the use of substituted methods or processes, is to be borne by the Section (Sub-contractor) proposing the substitution.
- 6.4 Said methods or processes **must** fit into the space allotted for the specified methods or processes.

## **7. CREDITS ARISING FROM SUBSTITUTIONS**

- 7.1 Any and all credits arising from the substitutions mentioned will be credited to the Sub-contract in such sums as may be assessed by TCHC project Team and the Sub-Contract Price will be adjusted accordingly. No substitutions will be permitted without the prior written approval of the TCHC project Team.

## **8. CODE REQUIREMENTS**

- 8.1 Proposed substitutions for materials, products, methods and processes shall meet the requirements of the Ontario Building Code 2006, as amended, and the regulations, by-laws and municipal statutes of authorities having jurisdiction including the latest amendments thereto.
- 8.2 Proposed substitution materials, products, methods and processes **must not** negate the compliance of adjacent materials, products and constructions with the requirements of the Ontario Building Code 2012, as amended, and the regulations, by-laws and municipal statutes of authorities having jurisdiction including the latest amendments thereto, and special bulletins, to which the proposed substitutions may be applied or attached.

## **9. SUPPLEMENTARY DEFINITIONS**

- 9.1 In the Specifications, references such as “shown on the Drawings”, “specified”, “scheduled”, “called for” and the like shall be deemed to include Work required by any of the Contract Documents.
- 9.2 In the Specifications the expression Section(s) is synonymous with Sub-contractor(s) if the context permits. The expression “all Sections” shall be deemed to include the Contractor.



## **10. MATERIAL HANDLING AND STORAGE**

- 10.1 Store packaged material in original, undamaged containers with manufacturer's labels and seals intact.
- 10.2 Store sand, masonry units and manufactured items off ground on approved supports and protect each pile with weatherproof covering. Stack to permit air circulation and to prevent damage to units. Use mechanical equipment for handling to minimize damage.
- 10.3 Prevent damage to materials during handling and storage.
- 10.4 Damaged materials are **not** acceptable. Remove damaged or rejected material from site immediately at the Contractor's or Sub-contractor's expense.

## **11. LINTELS AND BRIDGING**

- 11.1 Ensure correct formation and bridging of openings in masonry and structural walls required by the Sections (Sub-contractors). Conform to lintel requirements shown on Structural Drawings and Standard Details.

## **12. TEMPORARY WORK**

- 12.1 The expression "provide" shall be deemed to include the provision, installation and finishing, maintenance, servicing and removal of the Work described. All Work damaged by temporary installations shall be repaired and made good at no expense to TCHC.

## **13. EXAMINATION**

- 13.1 Each Section (Sub-contractor) shall examine surfaces prepared by other Sections (Sub-contractors) which affect its Work and shall ensure that defects are corrected. Commencement of Work shall imply acceptance of prepared Work.
- 13.2 All Sections (Sub-contractors) shall check and verify with the Contractor all dimensions, especially those pertaining to Work of more than just their Section (Sub-contractors Work).
- 13.3 All details and measurements of any Work which is to fit to, or conform with, Work already installed by other Sections (Sub-contractors, shall be taken at the job site by the Sections (Sub-contractors) concerned.

#### **14. SUPPLY AND / OR INSTALLATION**

- 14.1 Unless the word “only” suffixes “supply” or “install” or other variations of those words according to the Section wherein they are used, it is the express intent of this Contract Document that “supply and install” is implied.
- 14.2 Unless otherwise specified, Work shall be installed in accordance with the manufacturer’s printed directions and recommendations.

#### **15. SATISFACTION / APPROVAL**

- 15.1 The expression “to the satisfaction or approval of the Owner” shall be implied throughout the Specifications in regard to all materials and Workmanship.
- 15.2 “Submit for approval” means that the item in question is to be submitted to the Owner for approval and that a written acceptance of it is authorization for its use in the Work shall be obtained before it is incorporated in the Work. Sections (Sub-contractors) shall submit items for approval to the Owner via the Contractor.
- 15.3 An “approved Method” means that which has the manufacturer’s recommendation or which is generally accepted as good trade practice. The Owner’s approval is also required.

#### **16. FASTENINGS**

- 16.1 Use exposed metal fastenings and accessories of a permanent type that are of same texture, colour and finish as the base metal on which they occur.
- 16.2 Use metal fastening of the same material as the metal component they are anchoring or of a metal which will not set up an electrolytic action which would cause damage to the fastening and / or metal component.
- 16.3 Use fastenings of a type and size and install them in a manner to provide positive permanent anchorage of the unit to be anchored in position. Install anchors at required spacing to provide required load bearing or shear capacity.
- 16.4 Keep exposed fastenings to a minimum, evenly spaced and neatly laid out. Show on shop drawings.
- 16.5 Fastenings which cause spalling or cracking of material to which anchorage is being made are not permitted.
- 16.6 Limitations for use of Power Actuated Tools:
- .1 The use of powder activated fasteners is prohibited without the written authorization of the TCHC.
  - .2 Where such authority is given, it will be for low velocity type powder activated

- fasteners and for horizontal application only.
- .3 The manufacturer of the equipment selected, Ramset, shall send a representative to site to demonstrate the equipment prior to its use, and this representative shall make periodic inspections to ensure compliance with instructions issued by him and correct application of material. In all cases a shield shall be used where fasteners are applied to concrete. The use of fasteners in precast concrete is to be avoided if possible as there is an increased tendency to shatter surfaces.
  - .4 Fasteners shall not be nearer than 2.5 inches (65 mm) to the edge of any precast or cast-in- place formed concrete member.
  - .5 Under no circumstances shall fasteners be used on concrete members less than 3 inches (75 mm) in thickness, or in brick or unit masonry.
  - .6 Such fasteners shall not be used in areas where corrosion can take place, for instance due to high humidity or condensation.
  - .7 Generally, use support anchorage of cast-in-place type set into concrete forms prior to pouring concrete, or self-drilling type such as Phillips "Red Head" T-32 tie wire type. When drilling upwards, use jig to hold drill steady and plumb.
  - .8 Provide pull-out tests on anchors, or otherwise test to ensure anchorage is sufficient for particular application including a minimum safety factor of seven. Provide evidence of such tests if requested.
  - .9 Submit samples of proposed anchoring or hanging devices with technical data and test data.

## 17. EXISTING SERVICES

- 17.1 The Contractor is responsible for ensuring all "Existing Services" (including but not limited to structural elements, water pipes, drains, electrical cables and fixtures, communications cables and fixtures, security cables and fixtures, HVAC ducting, cables and fixtures, etc.) are not interrupted and / or damaged by the Construction Work. The Contractor must take all precautions to ensure that services buried underground or contained in a floor or contained in other elements are identified on the drawings provided by TCHC and have been clearly identified on the Work Site.
- 17.2 TCHC will not be liable for any loss, damage, delay or claim whatsoever resulting or arising from the absence in whole or part of services **not** shown on drawings.

## 18. EMERGENCIES

- 18.1 Notify TCHC project Team immediately should an emergency arise on the site, including personal injuries and accidents. Provide complete details on extent of emergency, cause and the action being taken. This notification shall be by telephone, text, or email immediately after the occurrence.

## 19. FIELD MARKING

- 19.1 **Do not** use wick pen to mark face of products to be installed in the Work. Such pen marks may show through applied paint or vinyl coatings and the like in due course. The Contractor will be held responsible and required to remedy such defects, classified as “latent defects” regardless of when they occur.

## 20. TRADEMARKS AND LABELS

- 20.1 Trademarks and labels, including applied labels shall not be visible in the finished Work. Such trademarks or labels shall be removed by grinding if necessary, or painted out where the particular material has been painted.
- 20.2 The exception of this requirement shall be those essential to obtain identification of mechanical and electrical equipment and those required to be visible by authorities having jurisdiction and those on plumbing fixtures and trims.

## 21. SAFETY

- 21.1 The Contractor is to be solely responsible for safety on site and for the compliance with all codes, regulations and laws of all authorities having jurisdiction.

## 22. EXISTING SURFACES

- 22.1 All surfaces to receive a new finish are to be properly prepared to receive the new finish supplied. All implementations to be repaired to ensure that blemishes **do not** telegraph through the new finish.
- 22.2 The term “Make Good” shall mean repairing or filling operations performed on existing floors, walls, ceilings or any other exposed surfaces. It is intended that finished surfaces match and line with adjoining surfaces.
- 22.3 “Make Good” all surfaces and finishes disturbed or damaged due to Work of this Contract Documents to match existing or adjoining surfaces. Ensure the materials used to repair the damage are compatible with the existing materials and work.

- 22.4 The Site **must** be restored to a condition equal to the existing conditions or, if specified elsewhere, to a condition better than the existing conditions.
- 22.5 Restore lands outside of the limits of the Work, which are disturbed or damaged due to the Work to their original condition in addition to complying with the requirements of the General Conditions of the Form of Agreement.

### **23. SUB-DIVISION OF WORK**

#### 23.1 Specification format and Contractor's responsibility for coordination of sub-contractors:

##### .1 Cooperation

1. Provide forms, templates, anchors, sleeves, inserts and accessories required to be fixed to or inserted into Work and set in place or instruct separate Sections (Sub-contractors) as to their locations.
2. Supply items to be "Built-In" as and when required together with templates, measurements, shop drawings and other related information and assistance.
3. Pay the cost of extra Work and make up time lost as a result of failure to provide necessary information and items to be "Built-In" in adequate time.

##### .2 Coordination

1. Ensure that Sections (Sub-contractors) cooperate with each other so that Work will be carried out expeditiously and will be satisfactory in all respects at completion.
2. Ensure that Sections (Sub-contractors) examine Contract Documents with particular emphasis to Work of other Sections (Sub-contractors) which may affect the performance of their own Work.
3. Ensure Sections (Sub-contractors) cooperate with other Sections (Sub-contractors) whose Work attaches to or is affected by their own Work, and ensure that minor adjustments are made to make adjustable Work fit to fixed Work.
4. Ensure that Sections (Sub-contractors) requiring foundations or openings to be left for the installation of their Work furnish the necessary information to the Sections (Sub-contractors) concerned in ample time so that proper provisions can be made.
5. Ensure that items to be "Built-In" are supplied as and when required by Sections (Sub-contractors) building in the items together with templates, measurements or shop drawings and other related information and assistance.
6. Ensure coordination of products supplied in metric and imperial units into the overall layout.
7. Under no circumstances will any extra payment be allowed due to the failure by the Trade Contractor to coordinate the Work. If required, in critical locations, prepare

interference and/or installation drawings showing the work of the various Sections as well as the existing installation, and submit these drawings to TCHC project Team and Consultant for review before the commencement of Work.

#### **24. CUTTING AND PATCHING**

- 24.1 The expression “make good”, refers to repair and restoration of both new and existing Work.
- 24.2 **Do not** cut, bore or sleeve load bearing members without first obtaining Consultant’s written authority for each condition, unless specifically shown and noted on Drawings.
- 24.3 Cut holes after they are located and sized by applicable Sections (Sub-contractors) requiring holes.
- 24.4 Have cutting and patching done by the Section (Sub-contractor) involved, e.g. have holes in masonry cut and patched by the mason. However, the Contractor shall be responsible for all cutting and remedial Work that is shown upon, or reasonably implied by the Contract Documents.
- 24.5 Make cuts with clean, true, smooth edges. Fit units to tolerances established for best standard practice for applicable Work. Make patches as inconspicuous as possible in final assembly.
- 24.6 Be responsible for correct formation and bridging of openings in masonry and structural walls required by other Sections (Sub-contractors).
- 24.7 Ensure compatibility between installed materials and security of installation.

#### **25. OTHER CONTRACTORS**

- 25.1 The Contractor is responsible to correlate and coordinate all Work with that of other Contractors having separate contracts with the owner or the TCHC in order to complete the Work as expeditiously as possible.
- 25.2 Prior to commencement of Work ensure that all Sections (Sub-contractors) are fully conversant with the extent of the Work, the conditions and materials on the project, the schedule of completion, restrictions to safety, and access.
- 25.3 Inform all Sections (Sub-contractors) that each is responsible for checking all Sections of the specification for Work pertaining to their Section (Sub-contractor’s Work).

#### **26. EXTENDED WARRANTY**

- 26.1 All warranties, including the required standard one year warranty, shall start at the date of publication of Substantial Performance of the Total Contract, or when Work of an

area is substantially completed, accepted and taken over for use by the TCHC. Ensure that all warranties comply with this stipulation prior to submission of same.

- 26.2 TCHC shall give prompt notice in writing to the Consultant and the Contractor of any defects noted during the warranty period(s), promptly requesting them to remedy such defects.
- 26.3 During the month prior to the end of the standard one year warranty period, TCHC, the Consultant and the Contractor, shall conduct an inspection of the project, the Contractor shall promptly remedy any defects due to faulty materials or Workmanship.
- 26.4 At the expiry of the standard one year warranty period the Contractor shall formally assign to TCHC all extended warranties given by Sub-contractors for their Work on the project and such Sub- contractors shall formally be advised of the assignment.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 SECTION INCLUDES**

- .1 Connecting to existing site services.
- .2 Special scheduling requirements.

### **1.2 ACCESS AND EGRESS**

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

### **1.3 USE OF SITE AND FACILITIES**

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with TCHC to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work provide temporary means to maintain security.
- .4 Provide sanitary facilities for use by Contractor's personnel. Keep facilities clean.
- .5 Closures: Protect work temporarily until permanent enclosures are completed.

### **1.4 EXISTING SITE SERVICES**

- .1 Notify, TCHC utility companies of intended interruption of services and obtain required permission.
- .2 Unless otherwise indicated, where Work involves breaking into or connecting to existing services, give TCHC 48 hours of notice for necessary interruption of mechanical, electrical, security or fire alarm service throughout course of Work. Keep duration of interruptions minimum. If the heating of a residence is to be interrupted or adversely affected for more than 3 hours, General Contractor is to provide residence occupants with supplemental electric heaters.
- .3 Provide for pedestrian and vehicular traffic.

### **1.5 SPECIAL REQUIREMENTS**

- .1 Perform Construction Work, Monday to Friday, from 08:00 hours to 17:00 hours Monday to Friday, unless otherwise approved by the Owner.
- .2 Contractor to coordinate with Site Superintendent for access.
- .3 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.



- .4 Keep within limits of work and avenues of ingress and egress.
- .5 Deliver materials during specified working hours indicated in this this Section, unless otherwise approved by TCHC.

## **1.6 TCHC SECURITY**

- .1 TCHC Security personnel is required to be present on site during construction.
- .2 Submit daily work schedule to TCHC, on a weekly basis, so site security can be scheduled. Any deviation from the regular schedule must be reported and approved by TCHC.

## **1.7 BUILDING SMOKING ENVIRONMENT**

- .1 Comply with smoking restrictions.
- .2 Smoking is not permitted on site, unless otherwise approved by the Owner.
- .3 If permitted by the Owner, the Owner will designate a specific outdoor location on site where smoking may occur.

## **1.8 SITE SPECIFIC**

- .1 Parking garage roof slab, where most of the townhouse units are located, is not suitable for construction loading and heavy machinery. Scaffolding is required to complete the Work.
- .2 Any repairs to the soffits **must** stop carbon monoxide from entering the Townhouse units above.

## **2. GENERAL FACILITIES PROTOCOLS**

### **2.1 NORMAL BUSINESS HOURS**

- .1 The building is residential and is to be considered occupied from Monday to Sunday 24 hours per day.

### **2.2 PROJECT DELIVERIES**

- .1 All deliveries are to be communicated to Site Superintendent for coordination purposes.

### **2.3 NOISY, PAINTING, GLUING, SUSTANCES WITH VOC'S AND / OR STRONG ODORS AND TARRING (SEALANTS, ROOFING, ETC.)**

- .1 All noisy, dusty, or odorous work is to be performed during the day inclusive of

compressors, drywall screw guns, hammer drilling, core drilling etc. Painting, gluing, working with substances that contain volatile organic compounds (VOC's) and /or have strong odours and tarring work (sealants, roofing, etc.) are to be performed during normal business hours.

- .2 Keep Work, equipment, material away from openings to residences as a precaution.

## 2.4 OCCUPATIONAL HEALTH AND SAFETY ACT

- .1 As per the Occupational Health and Safety Act, as amended, minimum requirements, anyone within construction area must wear a hard hat and safety boots. Failure to do so will result in immediate dismissal from site. Workplace Hazardous Materials Information System (WHMIS) compliant Material Safety Data Sheets (MSDS) are to be provided by all Sub-contractors identifying when, who, under what condition and in what quantity that they will use the product. TCHC's Project Manager will forward MSDS to Building Management.
- .2 Under the Occupational Health and Safety Act, as amended, the Contractor shall undertake the role of the "Constructor" as defined in the act. The Contractor shall be responsible to provide a full safety program for anyone who gets paid for services on the Site including management, labour, delivery drivers, service personnel and others involved for services on the Site. The Contractor will arrange for a pre-project meeting related to safety, joint safety inspections with the Owner where required, Site safety training and safety committees complete with accident investigation procedures.

## 2.5 PARKING

- .1 Under no circumstances is contractor, subcontractor, or equipment / material delivery allowed to park their vehicle in front of the building entrance or driveway. Doing so will result in having your vehicle tagged / towed.

## 2.6 SITE PROTECTION

- .1 Dust barriers **must** be used at all times during dusty work. Poly Sheet Dust Barriers are to be sealed tight to floor and ceiling and / or to the filter mediums on return air grills etc.
- .2 Clean up after all work **must** be performed immediately and the area(s) are to be left in a clean and safe manner. Failure to clean properly may result in the Contractor being charged for cleaning services obtained by the Building Management and the Building Management may terminate the Contractors access.

## 2.7 ADVANCE NOTIFICATION

- .1 **Seven (7) business days advance notification** is required for any work affecting the building occupants such as the following:
  - .1 Mold remediation (removal) work / asbestos abatement (removal) work
  - .2 X-raying and core drilling
  - .3 Notification of start time for painting and carpet laying
  - .4 Notification of exterior work
  - .5 Notification of replacement of windows and / or doors
  - .6 Notification of any noisy work that has to be done during the normal business hours of the occupants of the building / work site
  - .7 Notification of any building system shutdown (i.e. power, water etc.)
  - .8 Notification of any loss of use area (i.e. washroom shutdown, lunchroom etc.)

## 2.8 BUILDING EVACUATION

- .1 In case of a building alarm sounding all construction workers, visitors, supervisors etc. (everyone) is to evacuate the building. Use the stairs to leave the building and assemble outside away from the building. All Sub-contractor foremen are responsible to account for all their own workers leaving the building.

## 2.9 BREAKER PANELS

- .1 Electrical panels must not be touched without first informing and obtaining written permission from TCHC project Manager and the Building Management.
- .2 Whenever electrical power is shut off the Contractor must “Lock Out” and “Tag Out” any electrical panels or electrical breakers affected.

## 2.10 DOORS

- .1 For security purposes the building doors are to be close at all times.
  - .1 Exit doors **must** not be propped open for any reason.
  - .2 All fire doors **must** be kept closed at all times.

## 2.11 PROTOCOL FOR X-RAYING, CORE DRILLING AND ASBESTOS REMOVAL

- .1 **Seven (7) business days advance notification** is required when requesting to perform X-raying, core drilling and / or asbestos removal. Written permission must be obtained from the Owner and the Building Management before X-raying, core drilling and / or asbestos removal may begin.

- .2 Before the Building Management will allow the X-raying and coring to begin, the tenants in the affected the work area will be contacted so that a date and time for the Work can be selected that does not adversely impact the business of any of the tenants.
- .3 Prior to starting the X-ray work the contractor hired to carry out the work must provide a copy of their health and safety plan to the Owner.
- .4 The plan must include a copy any of required license(s), a description of the process to be used and any information needed to design safety limits of the work zone. In addition, the plan must include a process to protect the work zone from inadvertent entry, a list of potential hazards that may be encountered by the workers, training and / or instruction that the workers have received to address the hazards and a contingency plan in case of an emergency.

## 2.12 X-RAYING

- .1 The contractor that is doing the X-raying must meet the requirements of the legislation that regulates the process that is to be used (i.e. AEC Act for radioactive isotopes [cobalt 60] or the Provincial X-ray Safety Regulations O Reg. 681 when using X-rays [electromagnetic radiation]). In addition to the legislative requirements the following Protocol for the X-raying work **must** be followed:
  - .1 To prevent accidental entry into the work area at all entrances must be secured using ropes or caution tape. Radiation warning signs including the WHMIS hazard symbol **must** be visible at each point of potential access.
  - .2 The contractor **must** have a supervisor on site to coordinate the work and provide the required number of staff to completely secure the work area during x-raying and before starting the work; a sweep of the area **must** be conducted to ensure no unauthorized persons are present in the test area. While the x-raying is being undertaken, the perimeter **must** be monitored to prevent inadvertent entry. After the work is completed all signs, notices, and barriers must be removed.
  - .3 Lead blankets **must** be used to protect Electronic equipment.

## 2.13 CORE DRILLING

- .1 Before performing any core drilling work, the contractor **must** disclose to TCHC project Team and the Building Management whether the core drilling will be wet or dry and the results of the X-raying must be submitted to TCHC project Team and the Building Management. If dry core drilling will be performed appropriate dust control measure must

- be identified and used. If wet core drilling will be performed, water control measures must be identified and must be used.
- .2 Before commencing the core drilling operation, the contractor must ensure that it is safe to start drilling. The area must be secured, dust controls are in place, the equipment is set up as intended by the manufacturer, and all safety devices are present and functioning. The location selected to perform the core drilling must be appropriate and will not impact on the structural integrity of the building. The intended path of the coring unit must be free of all embedded power or communication wires, conduits, rebar, pipes and / or structures that could be damaged or disabled.
  - .3 All sources of asbestos are not to be disturbed. If this is not possible, the appropriate precautions **must** be taken to prevent the asbestos from becoming airborne which may include the use of either, a type 1, type 2 or type 3 process to comply with the asbestos designated substance regulations O. Reg 838 as am. O. Reg 510/92.
  - .4 All coring debris **must** be cleaned up and disposed of and the site returned to its original state after the coring is completed.
  - .5 If the coring debris contains asbestos, it **must** be cleaned up following the requirements of the designated substance regulations for asbestos O. Reg 838 as am. O. Reg. 510/92.

#### **2.14 LEAD ABATEMENT**

1. Mortar on the existing building contains lead, abatement work is required. Comply with regulation "Designated Substance – Asbestos" R.R.O. 1990, Reg. 837, made under Occupational Health and Safety Act as amended and "Designated Substance - Asbestos on Construction Projects And In Buildings And Repair Operations" R.R.O. 1990, Reg. 838, made under Occupational Health and Safety Act as amended by O. Reg 278/05 and O. Reg 510/92.
2. Follow appropriate legislative requirements for the abatement.

#### **2.15 ASBESTOS REMOVAL**

- .1 The asbestos removal Contractor **must** take the appropriate precautions to prevent the asbestos from becoming airborne which may include the use of either, a type 1 process, a type 2 process or a type 3 process to comply with regulation "Designated Substance – Asbestos" R.R.O. 1990, Reg. 837, made under Occupational Health and Safety Act as amended and "Designated Substance - Asbestos on Construction Projects And In Buildings And Repair Operations" R.R.O. 1990, Reg. 838, made under Occupational

Health and Safety Act as amended by O. Reg 278/05 and O. Reg 510/92.

- .2 In addition to the legislative requirements the following Protocol for the asbestos removal work **must** be followed:
  - .1 To prevent accidental entry into the work area at all entrances **must** be secured using ropes or caution tape. Hazard warning signs including the WHMIS hazard symbol **must** be visible at each point of potential access.
  - .2 The contractor **must** have a supervisor on site to coordinate the work and provide the required number of staff to completely secure the work area during the asbestos removal and before starting the work; a sweep of the area **must** be conducted to ensure no unauthorized persons are present in area where the asbestos removal will be performed. While the asbestos removal is being undertaken, the perimeter **must** be monitored to prevent inadvertent entry. After the work is completed all signs, notices, and barriers **must** be removed.

### 3. PROJECT CONDITIONS

#### 3.1 GENERAL

- .1 Most of the Projects will be performed during regular business hours in a residential setting. Areas will be occupied during normal business hours and at other times. For the purposes of planning or conducting work the contractor shall assume all residential units will be occupied seven days a week, 24 hours a day without break, unless otherwise specifically advised by the designated TCHC representative in writing. At end of each shift, vacuum clean and leave areas clean and in normal working condition.
- .2 All items removed shall be replaced / returned / reinstalled during same shift.
- .3 The Contractor shall not be responsible for moving furniture and equipment in areas of Work unless specifically specified in the Scope of Work. The Contractor shall be responsible for repairs or replacements of any damaged furniture.
- .4 The Contractor shall cooperate / coordinate with moving contractors retained by TCHC, and / or agencies.

**END OF THE SECTION**

**1. GENERAL**

**1.1 CASH ALLOWANCES**

- .1 Refer to the CCDC 2 – 2008 Paragraph GC 4.1 Cash Allowances and CCDC 2 – 2008 Supplementary Conditions Paragraph GC 4.1 Cash Allowances for the base details.
- .2 Progress payments on accounts of Work authorized under cash allowances shall be included in the Consultant's monthly certificate for payment.
- .3 A schedule shall be prepared jointly by the Consultant and the Contractor to show when items called for under Cash Allowances must be authorized by the Consultant for ordering purposes so that the progress of the Work will not be delayed.
- .4 Expected and the amount of each allowance is listed on the Rate Form included in the Bid package.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 SECTION INCLUDES**

- .1 To allow TCHC to compare total costs where alternate materials and methods might be used, and to enable the TCHC's decision prior to awarding the Contract, certain alternatives have been established as described in this Section of these Specifications.

### **1.2 RELATED SECTIONS**

- .1 Pertinent Sections of these Specifications describe the materials and methods required under the various alternatives.
- .2 The method for stating the proposed Contract Sum is described on the Pricing Form.

### **1.3 SUBMITTALS**

- .1 All alternatives requested by TCHC on the Pricing Form are required to be reflected in the Bid Submission submitted; however, do not submit alternatives other than those requested.

### **1.4 PRODUCT HANDLING**

- .1 If TCHC elects to proceed on the basis of one (1) or more of the alternatives, make all modifications to the Work required in the furnishing and installation of the selected alternative or alternatives to the approval of TCHC and at no additional cost to TCHC other than as proposed on the submitted Pricing Form.

## **2. PRODUCTS**

### **2.1 ALTERNATIVES**

- .1 Refer to the Pricing Form included in the Bid package - Alternate Prices.

## **3. EXECUTION**

### **3.1 RELATED CHANGES**

- .1 The Contractor will advise Sub-contractors and suppliers and make all necessary changes to the related Work occasioned by TCHC's choice of alternatives.

**END OF THE SECTION**



## **1. GENERAL**

### **1.1 DESCRIPTION**

- .1 The payment procedures to be used are defined in the CCDC 2 – 2008 Stipulated Price Contract and the CCDC 2 – 2008 Supplementary Conditions.
- .2 Submit one (1) set of red-line drawing with the request of payment.

### **1.2 REFERENCE STANDARDS**

- .1 Canadian Construction Documents Committee (CCDC)
- .2 CCDC 2 - 2008, Stipulated Price Contract
- .3 CCDC 2 – 2008, Supplementary Conditions

### **1.3 CASH FLOW SCHEDULE**

- .1 Prior to commencement of the Work, submit a detailed cash flow Projection schedule indicating anticipated billings on a month-by-month basis for duration of the Work, including timing of hold back release.
- .2 Update cash flow schedule monthly, recording cumulative as well as monthly totals.

### **1.4 PROGRESS BILLING BREAKDOWN**

- .1 Prior to commencement of the Work, submit a detailed progress billing breakdown and obtain approval of Consultant.
- .2 Progress billing breakdown shall include itemized values, (each excluding the Harmonized Sales Tax (HST)), applied against each of following:
  - .1 mobilization and start-up;
  - .2 general site expenses;
  - .3 each cash allowance;
  - .4 each Section of Specifications (Divisions 2-49 inclusive);
  - .5 As-Built Drawings broken down by architectural, structural, mechanical and electrical disciplines.
- .3 Project closeout, comprising separate sums for:
  - .1 manuals,
  - .2 maintenance materials and
  - .3 commissioning and training/demonstration for Owner's staff.

**1.5 PROGRESS PHOTOGRAPHS**

- .1 Prior to commencement of the Work, submit 6 photographs of the Place of the Work and 6 photographs along the lines forming the perimeter of the Place of the Work.  
Take digital progress photographs, weekly from date of commencement of the Work until date of Substantial Performance of the Work, sufficient to record the state of the Work.  
Provide digital progress photographs on compact disc to the Owner with monthly billings.
- .2 If any damage on an existing condition is discovered, contractor is required to advise consultant with a dated & stamped photograph for further direction on how to proceed.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 PROJECT COORDINATION**

- .1 Study Contract Documents to determine extent of the Work. Coordinate scope and extent of work to be performed by each trade. Neither organization of Specifications into Divisions nor arrangements of Drawings, schedules and standard Drawings shall affect in any way Contractor's control in, or diminish its responsibility for, dividing the Work or establishing each trade's scope of work. Claims for additional compensation arising from disputes between trades due to lack of coordination by Contractor will not be considered.
- .2 Coordinate Work of each Section as required for satisfactory and expeditious completion of Work. Take field dimensions required. Take into account existing Installations to assure best arrangements of components in available space. Consult before commencing Work in critical locations where arrangements of component may pause verification. Fabricate and erect Work to suit field dimensions and field conditions.
- .3 Provide forms, templates, anchors, sleeves, inserts and accessories or other components required to be fixed to or inserted in work.
- .4 Pay cost of extra work caused by, and make up time lost as result of failure to comply with these requirements at proper time.
- .5 Coordinate work of all trades including construction sequence, schedule and interfacing of all work. Coordinate work as required to incorporate metric modular components. Coordinate work of each trade as required for satisfactory and expeditious completion of the Work. Ensure components to be built in are supplied in time with setting Drawings and other related information.
- .6 Coordinate and schedule with all Subcontractors the work of which is affected due to installation of expansion joint assemblies to ensure expansion joint installation can progress unimpeded. Subcontractors shall ensure their work do not impede structural movement at expansion joint assemblies.
- .7 Ensure Contract Documents are fully coordinated with respect to architectural, structural, mechanical, electrical and other specialty requirements.

### **1.2 DOCUMENT ON SITE**

- .1 Maintain in good condition and order on site 1 copy of Addenda, proposed changes in the Work, Change Orders, CCO, CD, SIs, test reports, manufacturer's installation and application instructions, progress photographs, As-Built Drawings, approved progress

schedules, minutes of site meetings, and other modifications to Contract Documents

### **1.3 CONTRACTOR'S PERSONNEL AND SUBCONTRACTORS**

- .1 Submit complete list of Contractor's Subcontractors with addresses, telephone numbers and personnel along with Contractor's list of personnel and emergency contact information.
- .2 Provide resumes of quality control staff, shop and field supervisors complete with their skills, knowledge, duties and responsibilities.
- .3 Ensure compatibility within team of Subcontractors.
- .4 Owner takes no responsibility for compatibility or incompatibility (labour and otherwise) among Subcontractors and Suppliers employed on the Project.

### **1.4 PERSONNEL APPOINTMENT**

- .1 Appoint a senior member of staff, with full authority to commit Contractor to methods and schedules for construction, to participate actively in administration and maintenance of detailed construction schedule. Provide necessary information on progress of the Work to enable a status report to be produced every 2 weeks.
- .2 Superintendent:
  - .1 Appoint a senior member of staff, with full authority to commit Contractor to methods and schedules for construction, to participate actively in administration and maintenance of detailed construction schedule. Provide necessary information on progress of the Work to enable a status report to be produced every 2 weeks.

### **1.5 GENERAL REVIEW**

- .1 The Consultant shall review the Work for general conformance with Contract Documents, Code and authorities having jurisdiction. Review includes review of Shop Drawings, review of field Work and review of reports produced by various inspection and testing agencies.
- .2 Record each review in manner suitable for submission to Consultant at completion of Project along with inspection and testing reports at site meetings every second week.

### **1.6 PRODUCT SUBSTITUTION PROPOSALS**

- .1 After award of Construction Contract, Product substitution proposals will not be reviewed

- except in cases where written proof from Product manufacturer/distributor has been submitted to verify specified Products:
- .1 are unavailable (providing reasons why); and
  - .2 were ordered in advance and in accordance with manufacturer's recommendations for lead time but timely delivery of specified Products is not possible in order to maintain construction schedule.
- .2 Submit following for each Product substitution proposal:
- .1 Shop Drawings , including full details.
  - .2 samples; and
  - .3 difference in price, if any, in form of certified quotations of both selected and proposed substitutions.
- .3 Submit Contractor's written acceptance of use of substituted Products and certification that substituted Products:
- .1 will not exceed space requirements allocated for originally specified Products or, if they do, Contractor is including with substitution submission, design drawings, to accommodate substituted Product;
  - .2 are compatible with and inert to adjacent materials;
  - .3 will not affect Project schedule due to delays in delivery and Installation.
  - .4 have been priced to include design adjustments required to accommodate substituted Products.
- .4 Proposed substitutions require Consultant's review and acceptance and, if there is a difference in price, extra or credit requires Owner's acceptance.

## **1.7 CERTIFICATES AND TRANSCRIPTS**

- .1 Immediately after receiving notification of award of Contract, submit Workplace Safety & Insurance Certificate status, transcription of insurances and other certificates and transcripts required by Contract Documents or Consultant.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 START-UP MEETING**

- .1 Presided over by Owner and Consultant, after award of Contract.
- .2 Attendees shall be
  - .1 Consultant(s),
  - .2 Contractor,
  - .3 Contractor's Superintendent,
  - .4 Subcontractors (mechanical, electrical),
  - .5 major equipment Suppliers and
  - .6 others as appropriate.
- .3 Minimum agenda shall be
  - .1 list of major Subcontractors and Suppliers;
  - .2 tentative construction progress schedules;
  - .3 start date, submission of schedules and long term delivery items;
  - .4 insurance certificates, cash flow schedule, construction schedule, Shop Drawing submission schedule, bonds excluding Harmonized Sales Tax (HST), trade breakdown including value for close- out, Workplace and Safety & Insurance Board clearance certificate and Project sign;
  - .5 critical work sequencing;
  - .6 major equipment and Product deliveries and priorities;
  - .7 designation of responsible personnel;
  - .8 building permit status;
  - .9 procedures for maintaining Record Documents;
  - .10 use of premises including office, keys, work areas, storage areas, Owner's requirements (e.g., storage delivery, path of construction activities, by vehicle, by foot, carts, exterior and interior, elevator use, washrooms, bin location); construction facilities, controls, temporary hoarding, dust partitions, parking, hours, noisy work, shut down notification period, interruption of services, smoking, cell phone usage and construction aids;
  - .11 construction scheduling (particularly drying time for concrete slabs);
  - .12 temporary utilities;
  - .13 safety and first-aid procedures;
  - .14 security procedures; and
  - .15 housekeeping procedures.

## **1.2 OWNER, CONSULTANT AND CONTRACTOR (OCC) MEETINGS**

- .1 Purpose of the meetings is to review policy, financial status and schedule.
- .2 Meetings shall be held monthly, or on a mutually acceptable schedule.
- .3 Attendees shall be one senior representative of
  - .1 Owner,
  - .2 Consultant and
  - .3 Contractor.

## **1.3 SITE COORDINATION AND PROGRESS MEETINGS**

- .1 Conduct site meetings at regular intervals every 2 weeks. Consultant also reserves right to call additional special emergency site meetings on short notice without additional cost to Owner.
  - .1 mechanical and electrical Subcontractors,
  - .2 Subcontractors invited by Contractor and
  - .3 Owner and/or Consultant(s).
  - .4 Make physical arrangements for meetings.
  - .5 Contractor's Project manager and site superintendent,
  - .6 Prepare agenda for meetings.
  - .7 Meetings shall be chaired by the Contractor.
  - .8 Distribute written notice of each meeting minimum 7 Days in advance of meeting date, stating time and place, to all persons whose presence is required.
  - .9 Provide physical space and make arrangements for meetings.
  - .10 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
  - .11 Reproduce and distribute copies of minutes within 3 Working Days after each meeting to parties attending meeting, to parties affected by decisions made at meeting and to Consultant.
  - .12 Ensure representatives of Contractor, Contractor's consultants, Subcontractors and Suppliers attending meetings are qualified and authorized to act on behalf of each entity represented.
  - .13 Ensure relative information is available to allow meetings to be conducted efficiently.
  - .14 Review construction schedule to ensure rapid and efficient completion of the Work in accordance with Contract requirements. Keep Consultant informed of progress, of

- delays, and of potential delays during all stages of the Work.
- .15 Review, approve and correct minutes of previous meeting.
- .16 Review Work progress since previous meeting.
- .17 Review field observations, problems and conflicts.
- .18 Review issues which may impede construction progress schedule.
- .19 Review of off-site fabrication and delivery schedules.
- .20 Review submittals schedules.
- .21 Review Mock-up and sample installation requirements and schedules.
- .22 Review corrective measures and procedures to regain Project schedule.
- .23 Review quality standards.
- .24 Review pending changes and substitutions.
- .25 Review any other relevant business.

#### **1.4 DESCRIPTION OF RESPONSIBILITIES**

- .1 Meeting is to be minimum once every two weeks. Contractor to provide space unless otherwise arranged in advance with the designated TCHC representative.
- .2 Any costs and expenses that will be incurred by the Contractor, the Sub-Contractors and/or the Contractor's Agents for attending these Project Status Meeting must be included in the Stipulated Sum provided by the Contractor when the Contractor Completes the Pricing Submission Form included in the Bid package.

#### **1.5 PRE-INSTALLATION TRADE MEETINGS**

- .1 Regulatory Requirement Review Meeting:
  - .1 Provide pre-start regulatory requirement review meeting to parties associated with work of this Section as designated in Contract Documents or as requested by Consultant. As a minimum, discuss following:
    - .1 environmental procedure requirements,
    - .2 sustainable design requirements,
    - .3 and security requirements;
  - .2 Pre-construction Site Meeting:
    - .1 Prior to start of the Work, arrange for Project site meeting of all parties associated with trade Section. Presided over by the Contractor, include Consultant (who may attend), Subcontractor performing work of trade involved, testing company's representative and Contractor's consultants of applicable discipline,



- .2 Review Contract Documents to permit compliance with intent of this Section for work included under this trade, and ensure complete understanding of requirements and responsibilities relative to:
  - .1 work included,
  - .2 materials to be used,
  - .3 storage and handling of materials,
  - .4 installation of materials,
  - .5 sequence and quality control,
  - .6 Project staffing,
  - .7 restrictions on areas of work and other matters affecting construction
  - .8 to permit compliance with intent of trade under consideration.
- .2 Prior to commencing work of this Section arrange for manufacturer's technical representative to review with Contractor and Consultant, procedures to be adopted and conditions under which work is to be performed. Inspect surfaces to determine adequacy of existing and proposed conditions
- .3 Cooperate fully with other Subcontractors on The Work and promptly proceed with work of this Section as rapidly as job conditions permit.
- .4 Supply items to be built-in in ample time to be incorporated into work of other Subcontractors, together with measurements and other information required for location thereof.
- .5 Discuss following items:
  - .1 verify with manufacturer that specified products are compatible with and will satisfactorily adhere to substrates.
  - .2 weather conditions under which work will be done.
  - .3 anticipated installation issue.
  - .4 design.
  - .5 suitability with other properties of material to be used.
  - .6 recommendations of manufacturer
  - .7 operation and priming operation if required

**END OF THE SECTION**

## **1 GENERAL**

### **1.1 DEFINITIONS**

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission. Refer to Section 01 14 00 for construction work hours for this Project.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: overall system operated by Consultant to enable monitoring of project work in relation to established milestones.

### **1.2 REQUIREMENTS**

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.

- .3 Limit activity durations to maximum of approximately ten (10) working days, to allow for progress reporting.
- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Certificate of Substantial Performance and Certificate of Completion as defined times of completion are of essence of this contract.

### **1.3 SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00.
- .2 Submit to Consultant within ten (10) working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
- .3 Submit Project Schedule to Consultant within five (5) working days of receipt of acceptance of Master Plan.

### **1.4 MASTER PLAN**

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 Consultant will review and return revised schedules within five (5) working days.
- .3 Revise impractical schedule and resubmit within five (5) working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

### **1.5 PROJECT SCHEDULE**

- .1 Provide Project Schedule together with bid form as part of Rated Criteria. Develop detailed Project Schedule derived from Master Plan.
- .2 Planning and scheduling software shall be acceptable to Owner.
- .3 Submit a detailed critical path construction schedule with activities itemized to enable Contractor and Consultant to monitor progress of the Work. Ensure detailed Project Schedule includes as minimum milestone and activity types for each building as follows:
- .4 Indicate, without limitations, dates for:
  - .1 award.
  - .2 Permits.
  - .3 Mobilization.
  - .4 Demolition.

- .5 erection and dismantling of temporary facilities,
- .6 submission of Shop Drawings for various divisions of the Work,
- .7 submission of samples and installation dates for Mock-ups and sample installations,
- .8 Doors and Windows
- .9 Re-Cladding and Roofing.
- .10 Mechanical
- .11 Electrical.
- .12 Plumbing.
- .13 Testing and Commissioning.
- .14 commencement and completion of each major division of Work (including work to be done by Subcontractors),
- .15 critical work sequencing,
- .16 major equipment deliveries and priorities and
- .17 final completion date.
- .18 Update and resubmit schedule on a monthly basis.

**1.6 PROJECT SCHEDULE REPORTING**

- .1 Update Project Schedule on weekly basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

**1.7 PROJECT MEETINGS**

- .1 Discuss Project Schedule at regular site meetings specified in Section 01 31 19, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
- .2 Weather related delays with their remedial measures will be discussed and negotiated.

**END OF SECTION**

## **1. GENERAL**

### **1.1 SCHEDULE**

- .1 Within five (5) business days of contract award or at time mutually arranged between the parties, submit Construction Schedule to TCHC project Team.
- .2 Modify schedule if required by TCHC and resubmit for approval.
- .3 Schedule shall show:
  1. Commencement and completion dates of Contract.
  2. Implementation plan for the residential unit.
  3. Commencement and completion dates of stipulated stages if any.
  4. Commencement and completion dates of Sub-contractors.
  5. Order and delivery times for materials and major equipment, where possible.
  6. Dates for submission of Shop Drawings, material lists and samples.
  7. Any other information relating to the orderly progress of Contract, considered by the Contractor to be pertinent.
  8. Inspection dates of authorities having jurisdiction to obtain Occupancy Permit.
  9. Format shall be approved by the Owner.

## **2. UPDATING AND MONITORING**

- 2.1 Set up format of Construction Schedule to allow plotting of actual progress against baseline scheduled progress:
  - .1 Allow sufficient space for modifications and revisions to the Schedule as Work progresses.
  - .2 Schedules are to be updated bi-weekly, and presented for review or discussion. Submit 48 hours in advance of project meetings.
- 2.2 Copy of Schedule shall be displayed in site office during complete construction period and actual progress plotted bi-weekly.
- 2.3 Updated and Progress Reporting:
  - .1 Arrange participation, on site and off site, with Sub-contractors and suppliers, as and when necessary for the purpose of updating schedule and monitoring progress. Any costs and expenses that will be incurred by the Contractor, the Sub-Contractors and/or the suppliers for attending these Progress Reporting meetings to update the Project Schedule, updating the Project Schedule and distributing the Project

Schedule must be included in the Stipulated Sum provided by the Contractor when the Contractor Completes – Pricing Submission Form included in the Bid package.

- .2 Reviews of progress by inspections and meetings will be conducted at least twice a month or as directed by TCHC project Team.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 SUBMITTAL PROCEDURES**

- .1 Submit manufacturer's literature, data sheets for each type of material provided under this Section for Project. Data sheets shall provide all required information. Submit 3 copies of detailed instructions for maintaining, preserving and keeping materials in clean and safe conditions and give adequate warning of maintenance practices or materials detrimental to specified materials. Submit manufacturer's installation instructions.
- .2 Submit to Consultant, and to authorities having jurisdiction as required, documents listed to be submitted for review. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in the Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time or extra costs and no claim for extension of Contract Time or increase to Contract Price by reason of such default will be allowed. Final approval of authorities having jurisdiction, where required, shall be obtained prior to submitting Shop Drawings or other documentation to Consultant.
- .3 Prior to submission to Consultant, Contractor shall review all submittals. Submittals not stamped, signed, dated and identified as to specific Project will be returned without being examined and shall be considered rejected. Verify field measurements and ensure affected adjacent Work are coordinated. Confirm and correlate information pertaining to fabrication processes, quantities, techniques of construction and Installation and similar information.

### **1.2 ADMINISTRATIVE**

- .1 Submit to TCHC project Team & Consultant submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Work affected by submittal shall not proceed until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to TCHC project Team & Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.

- .6 Notify TCHC project Team & Consultant, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are coordinated.
- .8 The Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's / Engineer's review of submittals.
- .9 The Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Owner review.
- .10 Keep one reviewed copy of each submission on site.

### **1.3 SHOP DRAWINGS AND PRODUCT DATA**

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by the Contractor to illustrate details of a portion of Work.
- .2 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach, or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section (Sub-contractor Work) under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .3 Allow ten (10) business days for Owner's review of each submission.
- .4 Adjustments made on shop drawings by Reviewer(s) are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Owner prior to proceeding with Work.
- .5 Make changes in shop drawings as Owner may require, consistent with Contract Documents. When resubmitting, notify Owner in writing of any revisions other than those requested.
- .6 Accompany submissions with transmittal letter, in duplicate, containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Other pertinent data.
- .7 Submissions shall include:
  - .1 Date and revision dates.
  - .2 Project title and number.



- .3 Name and address of:
  - .1 Sub-contractor.
  - .2 Supplier.
  - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .8 Consultant's Shop Drawings Review:
  - .1 Consultant's review of Shop Drawings is for sole purpose of ascertaining conformance with general design concept and does not afford approval of items which remain Contractor's responsibility.
  - .2 Without limitation, among other things, Contractor remains responsible for:
    - .3 detail design inherent in Shop Drawings;
    - .4 errors and omissions in Shop Drawings;
    - .5 meeting requirements of Contract Documents.
    - .6 confirmed and correlated site dimensions;
    - .7 information that pertains solely to fabrication processes, techniques of construction and Installation including without limitations securement, fastening and anchoring requirements; and
  - .8 co-ordination of Work of all trades.
  - .5 Details of appropriate portions of Work as applicable:
    - .1 plans, sections and details;
    - .2 verified site dimensions;
    - .3 materials thicknesses and finishes;
    - .4 methods of setting and sealing;
    - .5 methods of securing, fastening and anchoring including field connections.
    - .6 Fabrication.
    - .7 Layout, showing dimensions, including identified field dimensions, and clearances.
    - .8 Setting or erection details.
    - .9 Capacities.
    - .10 Performance characteristics.
    - .11 Standards.
    - .12 Operating weight.

- .13 Wiring diagrams.
  - .14 Single line and schematic diagrams.
  - .15 Relationship to adjacent work.
  - .16 Do not make Product substitutions or alterations on Shop Drawings without Consultant's written acceptance in accordance with Product substitution proposal process. Replace unaccepted Product substitutions and complete Work in accordance with Contract Documents.
  - .17 Determine which Shop Drawings the authorities having jurisdiction will require for their approval and submit 2 final copies. Obtain approval and pay associated charges and fees.
- .9 After TCHC's review, distribute copies.
- .10 Submit minimum of two (2) prints and unlimited electronic copies of shop drawings each requirement requested in specification Sections and as TCHC project Team may reasonably request.
- .11 Submit minimum of two (2) prints and unlimited electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Owner where shop drawings will not be prepared due to standardized manufacture of product with the understanding the Owner will retain copies of the reviewed submission.
- .12 Supplement standard information to provide details applicable to project.
- .13 If upon review by TCHC project Team and Consultant, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .14 The review of shop drawings by TCHC project Team and Consultant is for sole purpose of ascertaining conformance with general concept. This review shall not mean that the TCHC approves detail design inherent in shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract Documents. Without restricting generality of foregoing, the Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all Sub-

contracts.

#### **1.4 SHOP DRAWING PROCEDURES**

- .1 Execute following, prior to submitting Shop Drawings to Consultant:
  - .1 review, check and mark-up Shop Drawings with comments and revisions;
  - .2 stamp each Shop Drawing with Consultant's shop drawing stamp;
  - .3 insert applicable Specification Section reference
  - .4 insert Contractor's review date and signature of Contractor's reviewer.
- .2 Submit following for Consultant's review:
  - .1 1 electronic file of each stamped Shop Drawing, to be returned to the Contractor;
- .3 2At Consultant's discretion, an electronic Shop Drawings review process may be instituted for some or all documents. In this case no hard copies will be returned to the Contractor. An electronic Shop Drawings procedure does not release the Contractor from providing hard copies of As-Built Drawings and maintenance and operations manuals as specified.
- .4 Re-productions of Consultant's Contract Documents are not acceptable as Shop Drawings.
- .5 Shop Drawings not conforming to above criteria will be automatically returned without review. Any resulting delays will be Contractor's responsibility.
- .6 Shop Drawings submitted without specified professional engineer design and stamp will be automatically returned without review. Any resulting delays will be Contractor's responsibility.
- .7 Do not resubmit Shop Drawings indicated as "REVIEWED FOR GENERAL DESIGN" and "REVIEWED AS NOTED".
- .8 Resubmit Shop Drawings indicated as "REVISE AND RESUBMIT" with required changes and comments addressed. Insert letter "R" after shop drawing number on resubmitted Shop Drawings, re-date and re-sign. Identify revisions from earlier submissions graphically on revised Shop Drawings;
- .9 Provide all Shop Drawings required by Contract Documents.

#### **1.5 COLOURS**

- .1 The Consultant will select colours and gloss values. Obtain direction on colours and gloss values in advance of need. If requested, submit samples for colour and gloss selection. Follow colour schedule provided by Consultant and use colours and glosses designated.

## **1.6 SAMPLES**

- .1 Prior to delivery of products to Site, submit for review samples in as requested in respective specification Sections. Label samples with origin and intended use. Samples must represent physical examples to illustrate materials, equipment or work and qualify to establish standards by which complete work is to be evaluated. Remove and discard Products of which samples have not been reviewed and accepted by Consultant.
- .2 Deliver samples to Consultant as directed with charges prepaid and allow for 1 of each sample to be kept by Consultant.
- .3 Unless otherwise specified, submit samples in duplicate.
- .4 Notify TCHC project Team and Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .5 For each sample, exhibit materials and finishes, such as colour (including maximum colour range within each specified colour), sheen, tone, texture, range of blemishes and other markings.
- .6 Identify each sample with:
  - .1 Project name and Project number;
  - .2 date of sample submission;
  - .3 component name using the specification's terminology;
  - .4 material (including alloy);
  - .5 finish including colour, sheen, texture; and
  - .6 dimensions including thicknesses.
- .7 Adjustments made on samples by TCHC are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to TCHC project Team & Consultant prior to proceeding with Work.
- .8 Alter, refinish or Provide additional samples until they are reviewed and accepted by Consultant.
- .9 Fabricate samples using same tools and techniques to be employed in actual installation of the Work.
- .10 Provide Products in the Work which are identical to accepted samples.
- .11 Make changes in samples which TCHC may require, consistent with Contract Documents.
- .12 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

.13 Provide samples required by Contract Documents.

**1.7 WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) REQUIREMENTS**

- .1 Comply with Workplace Hazardous Materials Information System in accordance with the Occupational Health and Safety Act (OHSA) requirements.
- .2 Provide, before commencement of the Work and maintain for duration of Contract, a list with current Materials Safety Data Sheets (MSDSs) of all hazardous materials proposed for use on Project.
- .3 In addition to submission of MSDSs as required under regulations, submit emission reports where available or off-gassing data to help control possible harmful effects to indoor air quality during construction, occupation and including maintenance period.
- .4 Label hazardous materials used and/or supplied on Project in accordance with WHMIS requirements.
- .5 Provide detailed procedures for safe handling storage and use of hazardous materials. List special precautions and safe clean up and disposal procedures. Conform to Environmental Protection Act and other requirements of authorities for disposal and clean up requirements.
- .6 Obtain from Owner, where applicable, a list and MSDSs of hazardous materials that may be handled, stored or used by Owner's employees and/or other contractors retained by the Owner at location of the Work.
- .7 Ensure those who handle or are likely to handle or be exposed to hazardous materials are fully instructed and trained in accordance with WHMIS requirements.

**1.8 OPERATING AND MAINTENANCE (O&M) MANUAL REQUIREMENTS FOR BUILDING SYSTEMS**

- .1 How to Use the Manual
  - .1 The initial section shall be a guide to the contents, structure and layout of the manual. This section will enable the reader to comprehend the scope and purpose of the document and to identify readily where specific information can be obtained.
- .2 Contractual and Legal Guides
  - .1 The contractual and legal records shall include:
    - .1 the name and address of the installation;
    - .2 the details of ownership, leases;
    - .3 the details of local and public authority consents;

- .4 the details of the design teams, consultants, installation contractors and associated Sub-contractors;
  - .5 the dates for the start of the installation, for the handover (practical completion) and for the expiry of the defects liability period;
  - .6 information of all guarantees affecting components, systems and plant items, together with expiry dates and names, addresses and telephone numbers of relevant contacts.
- .2 For each item of plant and equipment installed within the building and contained in the list of services covered by the O&M manual, copies of the following documents shall also be provided, where applicable:
- .1 test certificates;
  - .2 manufacturers' guarantees and warranties;
  - .3 insurance inspection reports;
  - .4 safety and fire certificates.
- .3 A clear statement shall be made in this section concerning those hazards and safety precautions of which the operators and maintainers of the installations need to be made aware. This shall include the following:
- .1 any known feature or operational characteristic of the equipment or systems installed which may produce a hazard;
  - .2 any known hazards against which protection can be provided;
  - .3 any mandatory requirements relating to safety;
  - .4 any other safety requirements which should be observed;
  - .5 any other relevant warnings.
- .3 Overall Purpose
- .1 This section shall provide a general overview of the original design intent. It shall include a summary for each engineering system installed giving:
    - .1 the parameters and conditions within which it has been designed to operate, including known hazards;
    - .2 the type of each service (gas, water, electricity, etc) required to operate the system;
    - .3 the intended method of control.
- .4 Description
- .1 This provides a detailed description of each engineering system installed. It shall include:

- .1 the system type (e.g. cold water supply, chilled water supply);
  - .2 system location and what it serves;
  - .3 what the system depends upon in order to function;
  - .4 design data, basic design parameters, basic assumptions made during design;
  - .5 reasons for selecting particular plants;
  - .6 expected service life (where applicable);
  - .7 planned operational efficiency;
  - .8 copy of all reviewed shop drawings.
- .5 Equipment Schedule
- .1 The type, model number and serial number of all component items within the system should be listed, together with the names of their respective manufacturers and suppliers.
- .6 Parts Identification and Recommended Spares
- .1 This shall comprise a parts identification list detailing and identifying replaceable assemblies, sub-assemblies and components. It shall include suppliers' recommendations for both spares and 'running spares' (i.e. parts required for scheduled replacement due to wear or deterioration).
  - .2 Items normally held in stock by a supplier, or for which a refurbishment service is available, shall be identified separately.
- .7 Commissioning Data
- .1 The results of all commissioning work and associated tests shall be provided, this shall include:
    - .1 measured data;
    - .2 measurement points;
    - .3 test equipment used;
    - .4 calibration certificate details;
    - .5 a statement of whether design requirements were achieved.
- .8 Operation
- .1 Instructions must be given for the safe and efficient operation, under both normal and emergency conditions, of each engineering systems installed. These will be in addition to manufactures' literature for plant items and shall include:
    - .1 a recommended strategy for operation and control;
    - .2 an outline of the general operation mode;
    - .3 control data (location, effect, object, sequence, limits of capability, modes, set

- points);
  - .4 procedure and sequences for start up, running and shut down, under both normal and emergency conditions;
  - .5 operating procedure for stand-by plant;
  - .6 precautions necessary to overcome known hazards;
  - .7 the means by which potentially hazardous plant may be made safe;
  - .8 target figures for both energy consumption and energy use;
  - .9 forms for recording plant running hours, energy consumption and the energy costs.
- .9 Maintenance Instructions
- .1 The manufacturer's recommendations and instructions for maintenance must be detailed for each item of plant and equipment installed. Clear distinction shall be made between planned tasks (preventive maintenance) and work done on corrective basis. Instructions shall be given on each of the following, as appropriate:
    - .1 the isolation and return to service of plant and equipment;
    - .2 adjustments, calibration and testing;
    - .3 dismantling and assembly;
    - .4 the exchange of components and assemblies;
    - .5 dealing with hazards which may arise during maintenance;
    - .6 the nature of deterioration and defects to be looked for;
    - .7 special tools, test equipment and ancillary services.
- .10 Maintenance Schedules
- .1 Maintenance schedules shall be provided for all preventive maintenance tasks identified in the manufacturer's recommendation and instructions for maintenance. These shall be based on both manufacturers' recommendations and other authoritative sources (e.g. statutory or mandatory requirements) and shall include:
    - .1 inspections;
    - .2 examinations;
    - .3 tests;
    - .4 adjustments;
    - .5 calibrations;
    - .6 lubrication;
    - .7 periodic overhaul.
- .11 Fault Finding



- 
- .1 Procedures for the logical diagnosis and correction of faults shall be provided for critical components, equipment and systems.
  - .12 Lubrication
    - .1 A schedule of all plant and equipment installed requiring lubrication shall be provided together with the manufacturers' recommendations on the type of lubricant and the method and frequency of application. Where the type of lubricant is identified by product name, a generic reference (e.g. CSA, ASTM standard) should be given.
    - .2 Information must also be provided on special requirements for the handling and storage of lubricants.
  - .13 Modification Information
    - .1 Modifications are authorized changes which may affect the safety, reliability, operation or maintenance of a system or any components.
    - .2 Information on permitted plant or system modifications allowed for by manufacturers or system designers shall be included for each system. Space must be provided in the manual for the recording of all modifications and changes as they occur (this would initially comprise a series of appropriately headed blank pages). Furthermore, it is essential that a procedure is devised and incorporated to ensure that all modifications are noted in every copy of manual, wherever it is located.
  - .14 Disposal Instructions
    - .1 Where relevant, information shall be provided detailing:
      - .1 any known dangers likely to arise during the disposal of specific items of plant or equipment together with the necessary precautions and safety measures;
      - .2 methods for safely disposing of or destroying the equipment or any part thereof, including packaging, insulation and fluids;
      - .3 sources from which further information can be obtained.
  - .15 Names and Addresses of Manufacturers
    - .1 Details of all manufacturers and suppliers of equipment listed in the manual shall be provided under this heading giving name, address, telephone number, email and web address. Any additional information likely to help the building operator to make contact with or obtain advice from a manufacturer or supplier shall also be included.
    - .2 Where appropriate, details of local stock lists or spare parts, replaceable assemblies or complete units shall also be provided.
    - .3 Details shall be arranged in alphabetical order of manufacturer or supplier name to provide a logical information retrieval procedure.

.16 Index of Plans and Drawings

- .1 An index shall be provided of all 'As Built' drawings supplied during the course of the installation work and on completion, identified by number and title.
- .2 The index shall also include a schedule of all drawings issued by manufacturers and suppliers during the course of the installation work and on completion (e.g. control panel wiring diagrams).

.17 Emergency Information

- .1 An important feature of any manual is the emergency information. Located, for ease of reference, at the end of the document, this should include names, address, telephone numbers, fax numbers and emails addresses of the appropriate contacts in the event of fire, theft or burglary, and gas, electricity or water failure / leaks. It shall also list those firms or staff to contact in the event of the failure or breakdown of such plant, lifts, boilers, chillers, building automation system and pumps.
- .2 Where applicable, location of firefighting equipment, hydrants and rising mains shall be described.
- .3 Special attention shall be given to hazards particular to the building.
- .4 Depending on TCHC policy, a note of security installations may also be included.

.18 Manufacturers Literature

- .1 A complete set of all manufacturers' literature shall be provided for the plant and equipment installed, and assembled for each building services systems. One (1) copy of all information including As Built drawings on a CD will be provided.
- .2 This literature shall provide the following information:
  - .1 description of the product purchased;
  - .2 the cost and date of purchase;
  - .3 performance- behavioral characteristics of the equipment in use;
  - .4 applications- suitability for use;
  - .5 operation and maintenance details;
  - .6 resources of labour, plant, material and space required;
  - .7 methods of operation and control;
  - .8 cleaning and maintenance requirements;
  - .9 protective measures;
  - .10 labour safety and welfare associated with equipment;
  - .11 public safety consideration.
- .3 Where this data is not adequately provided in manufacturers' literature the author of

the manual shall augment the literature as necessary.

**1.9 MISCELLANEOUS SUBMITTALS**

- .1 Provide submittals required by Contract Documents (e.g. plans, reports, certifications, results, records, etc.) for Consultant's review.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 CONSTRUCTION SAFETY MEASURES**

- .1 Canadian Standards Association (CSA): Canada
  - .1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.
- .2 National Building Code 2010 (NBC):
  - .1 NBC 2010, Division B, Part 8 Safety Measures at Construction and Demolition Sites.
- .3 National Fire Code 2010 (NFC):
  - .1 NFC 2010, Division B, Part 5 Hazardous Processes and Operations, subsection 5.6.1.3 Fire Safety Plan.
- .4 Province of Ontario:
  - .1 Occupational Health and Safety Act Revised Statutes of Ontario 1990, Chapter O.1 as amended, and Regulations for Construction Projects, O. Reg. 213/91 as amended.
  - .2 O. Reg. 490/09, Designated Substances.
  - .3 Workplace Safety and Insurance Act, 1997.
  - .4 Municipal statutes and authorities.
- .5 Treasury Board of Canada Secretariat (TBS):
  - .1 Treasury Board, Fire Protection Standard April 1, 2010
- .6 In the event of conflict between any provisions of above authorities the most stringent provision will apply.
- .7 Where Code or Contract Documents do not cover a particular requirement which is covered by National Building Code of Canada 2005, (NBCC) as amended, conform to requirements of NBCC including its related supplements. Where Contract Documents exceeds Code requirements satisfy such additional requirements.
- .8 The Contractor must prepare and submit a Health and Safety Plan within two (2) business days of award of contract and prior to mobilization of forces on site for review and approval by TCHC project Team.

### **1.2 SUBMITTALS**

- .1 Make submittals in accordance with Section 01 33 00.
- .2 Submit site-specific Health and Safety Plan: Within seven (7) days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

- .1 Results of site specific safety hazard assessment.
- .2 Results of safety and health risk or hazard analysis for site tasks and operations found in work plan.
- .3 Measures and controls to be implemented to address identified safety hazards and risks.
- .3 Provide a Fire Safety Plan, specific to the work location, in accordance with NBC, Division B, Article 8.1.1.3 prior to commencement of work. The plan shall be coordinated with, and integrated into, the existing Emergency Procedures and Evacuation Plan in place at the site. Deliver two copies of the Fire Safety Plan to the Consultant not later than fourteen (14) days before commencing work.
- .4 Contractor's and Sub-contractors' Safety Communication Plan.
- .5 Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during emergency situations
- .6 Consultant will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within ten (10) days after receipt of plan. Revise plan as appropriate and resubmit plan to Consultant within five (5) days after receipt of comments from Consultant.
- .7 Consultant's review of Contractor's final Health and Safety Plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .8 Submit names of personnel and alternates responsible for site safety and health.
- .9 Submit records of Contractor's Health and Safety meetings when requested.
- .10 Submit two (2) copies of Contractor's authorized representative's work site health and safety inspection reports to Consultant, weekly.
- .11 Submit copies of orders, directions or reports issued by health and safety inspectors of the authorities having jurisdiction.
- .12 Submit copies of incident and accident reports.
- .13 Submit Material Safety Data Sheets (MSDS).
- .14 Submit Workplace Safety and Insurance Board (WSIB)- Experience Rating Report.

### **1.3 FIRE SAFETY REQUIREMENTS**

- .1 Comply with requirements of the Fire Protection and Prevention Act 1997, the Ontario Fire Code O. Reg 388/97 as Amended by O. Reg. 398/98, 428/98, 302/99, 475/00 and 315/01 and other authorities having jurisdiction. Conform to National Fire Protection

Association (NFPA) 101, Life Safety Code for exit requirements.

- .2 This standard may be viewed at and copies may be obtained from:

Ministry of Community Safety and Correctional Services

Office of the Fire Marshall

5775 Yonge St., 7th Floor

Toronto, Ontario M2M 4J1

#### **1.4 FALSEWORK**

- .1 Design and construct falsework in accordance with CSA S269.1-1975.

#### **1.5 SCAFFOLD**

- .1 Design and construct scaffolding in accordance with CAN/CSA S269.2-M87.

#### **1.6 FILING OF NOTICE**

- .1 File Notice of Project with Provincial authorities prior to commencement of Work.

#### **1.7 SAFETY ASSESSMENT**

- .1 Perform site specific safety hazard assessment related to project for residents and TCHC representatives

#### **1.8 MEETINGS**

- .1 Schedule and administer Health and Safety meeting with Consultant prior to commencement of Work.

#### **1.9 REGULATORY REQUIREMENTS**

- .1 Comply with the Acts and regulations of the Province of Ontario.  
.2 Comply with specified standards and regulations to ensure safe operations at site.

#### **1.10 GENERAL REQUIREMENTS**

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.  
.2 Consultant may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns either accepting or

requesting improvements.

- .3 Relief from or substitution for any portion or provision of minimum Health and Safety standards specified herein or reviewed site-specific Health and Safety Plan shall be submitted to Consultant in writing.

#### **1.11 PROJECT SITE CONDITIONS**

- .1 Work at site will involve contact with:
  - .1 Refer to asbestos specifications and Reports appended to the end of this Document for hazardous materials that might be found on site.
  - .2 Asbestos-containing materials.
  - .3 Lead-containing materials.
  - .4 Chlorofluorocarbons (CFCs)
  - .5 Silica.

#### **1.12 COMPLIANCE REQUIREMENTS**

- .1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990 Chapter 0.1, as amended.

#### **1.13 RESPONSIBILITY**

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
- .3 Where applicable the Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act and Regulations for Construction Projects for the Province of Ontario.

#### **1.14 UNFORSEEN HAZARDS**

- .1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, immediately stop work and advise Consultant verbally and in writing.
- .2 Follow procedures in place for Employees Right to Refuse Work as specified in the

Occupational Health and Safety Act for the Province of Ontario.

### **1.15 HEALTH AND SAFETY CO-ORDINATOR**

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
  - .1 Have site-related working experience specific to activities associated with designated substances.
  - .2 Have working knowledge of occupational safety and health regulations.
  - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
  - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
  - .5 Be on site during execution of Work and report directly to and be under direction of site supervisor.

### **1.16 POSTING OF DOCUMENTS**

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province of Ontario, and in consultation with Consultant.
- .2 Contractor's Safety Policy.
- .3 Constructor's Name.
- .4 Notice of Project.
- .5 Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members (if applicable).
- .6 Ministry of Labour Orders and reports.
- .7 Occupational Health and Safety Act and Regulations for Construction Projects for Province of Ontario.
- .8 Address and phone number of nearest Ministry of Labour office.
- .9 Material Safety Data Sheets.
- .10 Written Emergency Response Plan.
- .11 Site Specific Safety Plan.
- .12 Valid certificate of first aider on duty.
- .13 WSIB "In Case of Injury at Work" poster.



- .14 Location of toilet and cleanup facilities.

#### **1.17 CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Consultant.
- .2 Provide Consultant with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Consultant may stop Work if non-compliance of health and safety regulations are not corrected.

#### **1.18 BLASTING**

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

#### **1.19 POWDER ACTUATED DEVICES**

- .1 Use powder actuated devices only after receipt of written permission from Consultant.

#### **1.20 WORK STOPPAGE**

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.
- .2 Assign responsibility and obligation to Health and Safety Coordinator to stop or start Work when, at Health and Safety Coordinator's discretion, it is necessary or advisable for reasons of health or safety. Consultant may also stop Work for health and safety considerations.

**END OF THE SECTION**

**1. GENERAL**

**1.1 FIRES**

- .1 Fires and burning of rubbish on site is not permitted.

**1.2 DISPOSAL OF WASTES**

- .1 All disposal shall meet City of Toronto Standards.
- .2 Disposal of waste or volatile materials, such as mineral spirits, oil or paint thinner into storm or sanitary sewers prohibited. Dispose of waste promptly.
- .3 Space will be made available in the loading dock for a dumpster.
- .4 Separate out recyclables materials and dispose of in appropriate manner.

**1.3 POLLUTION CONTROL**

- .1 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures.
- .2 Maintain temporary pollution control features installed under this Contract.
- .3 Control emissions from equipment and plant to local authority's emission requirements.
- .4 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.
- .5 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 REGULATORY DOCUMENTS**

- .1 Perform Work in accordance with National Building Code of Canada (NBC) 2010, National Fire Code of Canada (NFC) 2010 and Ontario Building Code (OBC) 2012 and Ontario Fire Code (OFC) 2007 including all amendments up to bid closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Conform to the Building Code (Ontario Reg. 368/13) including all current change series, Canadian Electrical Code (CEC), CAN3-B44-M90 and Supplement No. 1, and CSA W59-M1989 as applicable. Conform to the Occupational Health and Safety Act, Ontario, 1980 and to all other applicable Codes and Building By-laws, hereinafter referred to as Codes. Conform to the requirements of the authorities having jurisdiction, including public utilities. Where required under The Occupational Health and Safety Act, engage a registered Professional Engineer to design formwork and falsework for concrete.
- .3 Nothing contained in the Drawings or Specifications shall be so construed as to be in conflict with any law, by-law or regulation of the municipal, provincial or other authorities having jurisdiction.
- .4 Contract forms, codes, specifications, standards, manuals, and installation, application and maintenance instructions, referred to in these Specifications are the latest published editions at the date of signing the Contract.
- .5 Provide copies of Standards referred to in the Specification for joint use of Contractor and Consultant on site, when so requested by the Consultant.
- .6 Meet or exceed requirements of:
  - .1 Contract documents.
  - .2 Specified standards, codes and referenced documents.

### **1.2 HAZARDOUS MATERIAL DISCOVERY**

- .1 Stop work immediately and notify Departmental Representative if materials which may contain designated substances DMS or PCBs, other than those identified in Section 01 35 29 are discovered in course of work.

### **1.3 TAXES**

- .1 Pay applicable Federal, Provincial and Municipal taxes.

#### 1.4 EXAMINATION

- .1 Examine existing conditions and determine conditions affecting work.
- .2 Conduct concrete floor moisture testing using Calcium Chloride moisture tests.
- .3 Submit test results to Departmental Representative for approval prior to installing any flooring. Conduct one test per 100 m<sup>2</sup> of area being covered.

### 2. FIRE SAFETY FEATURES

#### 2.1 DESCRIPTION OF RESPONSIBILITIES

- .1 Ensure that all fire safety features called for in the Contract Documents are supplied and installed to meet fire safety standards established by the authorities having jurisdiction. The Contractor shall ensure that the Work of Sub-contractors is properly coordinated to achieve the intent of this Specification. All fire-resistant materials and/ or assemblies shall conform to the labeling requirements of Underwriters Laboratories of Canada or Warnock Hersey, including firestopping.
- .2 Work **must** be done in accordance with all environmental regulations.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 SECTION INCLUDES**

- .1 Inspection and testing, administrative and enforcement requirements.
- .2 Tests and mix designs.
- .3 Mock-ups and sample units.
- .4 Mill tests.
- .5 Equipment and system adjust and balance.

### **1.2 SAMPLES AND MOCK UP**

- .1 Submit samples of as required by specific Specifications section.
- .2 Reports: Submit written field inspection and test report results after each inspection.
- .3 Mock-ups: Provide Mock-ups in locations designated by Consultant and as required to demonstrate quality of workmanship. Maintain Mock-ups during construction in an undisturbed condition as a standard for judging the completed work.
  - .1 Fabricate, deliver, and erect one full scale 1200 mm wide x 1800 mm high mock-up construction, as applicable, in location acceptable to Consultant.
  - .2 Demonstrate finish, colours, typical connections of the project, and quality of workmanship.
  - .3 Approved mock-ups may form part of finished work if left undisturbed at time of Substantial Performance of the work. Remove and dispose of mock-ups which do not form part of Work.

## **2. QUALITY REQUIREMENTS**

### **2.1 GENERAL**

- .1 Comply with Division 1 requirements and documents referred to therein (if included).

### **2.2 JURISDICTIONAL AUTHORITIES**

- .1 Where reference is made to jurisdictional authorities, it shall mean all authorities who have within their constituted powers the right to enforce the laws of the place of the building / Work site.
- .2 Requirements of jurisdictional authorities shall apply to the Work in precedence to the requirements of the Contract Documents, except that more stringent requirements of the Contract Documents shall take precedence over requirements of jurisdictional authorities.

- .3 The Contractor shall carry out all Work in full compliance with the requirements of the Municipal, Provincial and National Authorities having jurisdiction.
- .4 No work shall commence until all permits are obtained.
- .5 Where the Consultant applies for the Building Permit as the Agent for the Owner, the Contractor shall provide notice under Corporate seal to Municipal Building Authorities having jurisdiction to confirm the Contractors assumed designation as:
  - .1 "Prescribed Person" as per Building Code Act, Section 8, subsection 10.2-(1)
  - .2 "Authorized Agent of Owner" as permit applicant to replace Consultant on permit form as per OBC 2.4.1.1A
  - .3 "Person to whom Permit is Issued" as per OBC 2.4.5.

## **2.3 REGULATORY REQUIREMENTS**

- .1 Permits, Notices, Laws and Rules
  - .1 Conform to the General Conditions of the Contract as required. Comply with The Building Code Act, as amended; and the Ontario Building Code, 2012, (OBC) as amended; and Regulations and by-laws of other authorities having jurisdiction including latest amendments thereto: all hereafter referred to as Code, where Code or Contract Documents do not cover particular requirement which is covered by National Building Code of Canada (NBC), 2010, as amended, conform to requirements of NBCC including its related supplements. Where Contract Documents exceeds Code requirements satisfy such additional requirements.
  - .2 Conform to National Fire Protection Association (NFPA) 101, Life Safety Code for exit requirements.
  - .3 Conform to The Ontario Fire Code - Ontario Regulation 213/07 enacted under The Fire Marshall's Act, including latest amendments.
  - .4 Further to the General Conditions of the Contract prepare and submit prior to commencing work a Waste Audit Report and Waste Reduction Plans in accordance with Ministry of Environment, Ontario Regulations 102/94 Waste Audits and Waste Reduction Work Plans and 103/94 Industrial Commercial and Institutional Source Separation Programs made under Environmental Protection Act.
  - .5 Unless otherwise indicated, obtain and pay for all other permits, licences and certificates of inspection. Ensure that permits, licences and certificates included under specific Sections are provided as specified. Forward copies of all permits to the Owner before

commencing construction.

- .6 Conform to the General Conditions of the Contract - for hours of work, rates of wages paid, terms of employment and working conditions shall be in accordance with Ontario Fair Wage Program - Labour Conditions for Industrial, Commercial and Institutional Sector Construction Contract. Comply with all requirements with the Workers' Compensation Act.

## **2.4 IMPERIAL / INTERNATIONAL SYSTEM OF UNITS (SI)**

- .1 Submittals containing measurements of any kind in Imperial system of measurement shall be on the Owner's approval only. Submit all measurements in International System of Units (SI).
- .2 Submittals containing measurements of any kind shall have measurements in language of International System of Units (SI) conforming to following standards:
  - .1 National Standard of Canada CSA3-Z234.1 "Metric Practice Guide".
  - .2 IEEE-ASTM-10, IEEE/ASTM S1-10 "Standard for Use of the International System of Units (SI) the Modern Metric System".
  - .3 National Standard of Canada CAN3-A31-M "Series of Standards for Metric Dimensional Co-ordination in Building".

## **3. QUALITY ASSURANCE**

### **3.1 GENERAL QUALITY OF WORK**

- .1 Do Work in accordance with industry practice for type of work unless Contract Documents stipulate more precise requirements.
- .2 Do Work in neat and careful manner to retain Work plumb, square, and straight.
- .3 Ensure Work is properly related to form close joints and appropriately aligned junctions, edges and surfaces and is free of warp, twist, wind, wave or other irregularities.
- .4 When required by specifications or by manufacturer's recommendations, have manufacturer, supplier or accredited agent; inspect Work which incorporates their products.
- .5 Do not permit materials to come in contact with other materials whether in presence of moisture or otherwise if conditions will result in corrosion, stain or discolouration or deterioration of completed Work. Provide compatible, durable separators where such contact is unavoidable.

### **3.2 FIELD QUALITY CONTROL**

#### **.1 Independent Inspection and Testing:**

- .1 Owner may retain an independent Consultant to carry out periodic supervision during construction. If requested by Consultant, contractor to take cut-test samples of assembly, identify locations and submit to Consultant for review and testing.
- .2 Employment of Inspection and Testing agencies does not relieve the Contractor's responsibility to perform work in accordance with the Contract Documents.
- .3 Provide assistance required for executing Inspection and Testing by the appointed agencies and/or the Consultant.
- .4 Allow Inspection and Testing agencies and/or the Consultant access to the work.
- .5 If required by the Inspection and Testing agency or by the Consultant, provide cuts for testing. Repair cuts without cost to the Owner.
- .6 Contractor shall make an allowance for minimum one cut test per day and all required patching to match existing assembly.
- .7 Failed test results will require remedial work acceptable to Consultant and may entail complete removal and replacement of failed areas.
- .8 Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

### **3.3 FABRICATOR'S QUALIFICATIONS**

- .1 Conform to requirements specified under respective trade Section as applicable.

### **3.4 INSTALLER'S QUALIFICATIONS**

- .1 Conform to requirements specified under respective trade Section as applicable.

### **3.5 MANUFACTURER'S QUALIFICATIONS**

- .1 Conform to requirements specified under respective trade Section as applicable.

### **3.6 MANUFACTURER'S FIELD SERVICES**

- .1 Conform to requirements specified under respective trade Section as applicable.

### **3.7 TESTING AGENCY QUALIFICATIONS**

- .1 Testing shall be conducted in accordance with requirements of Ontario Building Code



unless advised otherwise in Contract Documents or by TCHC project Team & Consultant.  
Obtain certification where required by applicable codes and standards.

- .2 Qualifications of Inspectors: Submit list of inspectors to be employed on this Project and obtain TCHC project Team & Consultant approval.
- .3 All testing and inspection shall be performed by qualified independent inspectors and / or technologist certified by Professional Engineer or performed directly by a Professional Engineer in conformance with applicable codes and certification programs and specifications.
- .4 Inspectors shall be qualified to perform type of inspection or testing required, and shall meet basic requirements of ASTM E329, "Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction".
- .5 Concrete testing shall be performed by testing company conforming to requirements of CSA A283 Qualification Code for Concrete Testing Laboratories, as required for this Project. Inspection report format and distribution requirements will be established by the Owner.

#### **4. QUALITY CONTROL**

##### **4.1 CONTRACTOR'S QUALIFICATIONS**

- .1 Prior to commencement of Work, be responsible to establish quality control system protocols, rules, related chain of commands and commitment to provide quality Work as intended in Contract Documents for Work.
- .2 Provide position specifications of quality control staff, shop and field supervisors complete with their skills, knowledge, duties, and responsibilities.

##### **4.2 PAYMENT FOR QUALITY CONTROL SERVICES**

- .1 Appoint and pay independent inspection and testing company or independent inspection and testing consultant, to verify requirements of Contract Documents. Be responsible for quality control, employ quality control staff, supervisors and implement quality control procedures. Submit nominated inspection and testing agency or consultants to the Owner for approval.
- .2 Conform to the General Conditions of the Contract as required. Inspection and testing required by Contract Documents, Codes and Regulations and / or by authorities having jurisdictions shall be the Contractor's responsibility and paid for by the Contractor.

- .3 In accordance with the Contract documents, Inspection and testing by the Contractor does not relieve the Contractor of its responsibility for performance of Work. Be responsible for care and control of Work.
- .4 In addition to inspection and testing specified to be provided as part of Work or provided by the Contractor for its own verification of Work TCHC may appoint, separately, inspection and testing companies to confirm certain Work where specifically stated or where they may later require, to confirm that such Work is in accordance with the Contract documents. Wherever documents state the inspection and testing companies may be appointed by TCHC, give adequate notice to TCHC project Team to determine if such inspection and testing companies will be appointed. In such cases, the following will apply:
  - .1 TCHC will pay costs of such additional inspection and testing; except where such additional tests or inspections reveal Work not in accordance with the Contract then the Contractor shall bear the cost of such tests and further tests as required, to verify acceptability of the corrected Work.
  - .2 Advise TCHC project team, Consultant and applicable inspection and testing company(s) no less than five (5) working days prior to commencement of Work to proper facilities and coordination are provided. Do no work without required inspection and testing.
  - .3 Establish schedule of testing, number of testing reports, submission and distribution of testing reports. Inspection and testing report shall provide all pertinent data regarding Site conditions, dates, test references, product identification, procedures and description, instructions and recommendations and other relevant information. Identify clearly products not meeting requirements of Contract Documents and provide measures and recommendations for correcting situation. Advise TCHC project Team & Consultant promptly when product or system fails to meet applicable Standards.
  - .4 Materials and work not in accordance with requirements of Contract Documents will be rejected at any time during progress of work. Defective material and work whenever found prior to Total Completion of Work may be rejected regardless of previous inspection or testing.

#### **4.3 FIELD QUALITY CONTROL**

- .1 The Contractor shall perform all inspections and testing required by Code or governing authorities, by trade Sections and as required to clearly demonstrate integrity of materials and quality of performance of Work including but not limited to geo-technical, compaction, cast-in-place concrete, concrete products, waterproofing, structural steel, welding, building envelope, roofing, thermography; thermal bridging and air leaks shall be within acceptable standards established in ASHRAE 90.1. as further defined herein. Carry out X-ray examination of all concrete before coring. Cooperate and coordinate testing and inspection requirements with testing agency for designated requirements. Retain Geotechnical Report on Site. Provide full cooperation to testing company by providing assistance on Site as well submitting samples of fill materials.
- .2 Fireproofing and Firestopping: Review documents submitted by TCHC project Team & Consultant to ensure products and application procedures and systems are in accordance with requirements of the Contract Documents to yield the required fire resistance criteria. Inspect and verify substrate to receive materials and verify the product conforms to designed ULC requirements. Review application procedures to verify that installation provide required thickness, density and have proper backing to provide required fire resistance rating and meet specified criteria.
- .3 Sealants - Appoint independent inspection and testing company to carry out inspection and testing. Tests may include sampling of installed product where adhesion, cohesion or reversion failure is suspected. Where Work or materials fail to meet requirements as indicated by test results, pay costs of additional inspection and testing required for new replacement work or materials. Submit a signed certificate from sealant manufacturers prior to commencement of this work which states:
  - .1 surface preparation requirements;
  - .2 priming and application procedures;
  - .3 verification that proper joint backing material is selected;
  - .4 verification that sealant materials are selected for use from those specified;
  - .5 verification that sealants are suitable for purposes intended and joint designs;
  - .6 verification that sealants are compatible with other materials and products with which they come in contact, including but not limited to sealants provided under other Sections, insulation adhesives, bitumens, vapour barriers, waterproofing, metals and metal finishes and stone;

- .7 verification that sealants will not stain substrate;
- .8 verification that sealant is suitable for temperature, humidity and weather conditions at time of application.
- .4 Painting and Finishing - Inspection: Test compatibility of fire retardant coatings with non-fire retardant coatings. If incompatible and bubbles appear, remove existing non-fire retardant coatings and prepare surfaces to suit requirements. Comply with Canadian Painting Contractors Association (CPCA) Architectural Specification Manual, Chapter 7. Comply with OPCA requirements for 'Request for Assignment of An Inspector' and provide TCHC project Team & Consultant with OPCA guarantee.

#### **4.4 TESTING AND INSPECTION OF MECHANICAL AND ELECTRICAL SYSTEMS**

- .1 Provide testing and inspection of Mechanical and Electrical Systems. All Commissioning work is to be carried out by Independent Professional Engineer under seal.

#### **4.5 DESIGNATED SUBSTANCES TESTING AND INSPECTION**

- .1 Testing and Inspection Agency for Designated Substances as required by Authorities having jurisdiction shall be appointed by TCHC. The Contractor shall co-ordinate and manages activities of Testing and Inspection Agency to ensure efficient and timely execution of the work.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 DESCRIPTION OF RESPONSIBILITIES**

- .1 Accept responsibility for all temporary structures and comply with applicable rules and regulations. Pay all taxes and all other charges.
- .2 The expression "provide" shall be deemed to include the provision, installation and finishing, maintenance, servicing and removal of the Work described. All Work damaged by temporary installations shall be repaired and made good at no expense to TCHC.
- .3 Maintain temporary facilities in good condition.
- .4 When the building is enclosed, if appropriate or if so directed by the Consultant, remove temporary structures and provide equivalent enclosed accommodation within the building.
- .5 On completion, or at earlier date if the facility is no longer required or if alternative accommodation provided within the building, clear away temporary facilities and make good all Work disturbed.

## **2. TEMPORARY UTILITIES**

### **2.1 DESCRIPTION OF RESPONSIBILITIES**

- .1 Provide, install, maintain and locate where directed the following temporary facilities for the Work and for all Sub-Contractors except where specified otherwise and remove them upon completion of the Work. These facilities shall be considered minimal and shall be increased as necessary. Pay all charges and billings in connection therewith.
- .2 Light and Power: The Contractor may use the existing electrical service, if available, at no charge. Provide temporary panels, each panel to have service and pole capacity suitable for construction requirements and to authorities and utilities and temporary wiring with pigtails to all areas of each floor as required for adequate light and power excluding extension cords and lamps therefore which shall be provided by Sub-contractors requiring them.
- .3 Water: (Separate from water required for fire protection) with adequate pressure at every floor, except hose extensions which shall be provided by Sub-contractors requiring them. Water supply shall be potable, available from existing service.
- .4 Telephone / Fax: Provide telephone and fax service as required for the use of the Contractor's personnel engaged on the work. Pay charges in connection therewith.

**END OF THE SECTION**

## **1. TRAFFIC CONTROL AND SECURITY**

### **1.1 DESCRIPTION OF RESPONSIBILITIES**

- .1 Make arrangements with TCHC for delivery of materials and equipment including security.
- .2 Parking is not provided for personnel working on site.

## **2. CONTRACTOR'S SITE OFFICE**

### **2.1 DESCRIPTION OF RESPONSIBILITIES**

- .1 Make arrangements with TCHC for temporary office space.
- .2 Provide telephone and internet in Contractor's site office. Pay telephone is not acceptable.

## **3. SANITARY FACILITIES**

### **3.1 DESCRIPTION OF RESPONSIBILITIES**

- .1 TCHC will make provisions for use of existing washrooms, if available, by the Contractor and his Sub-contractors. Should the existing washrooms not be available for use the Contractor will provide portable and weatherproof toilets. The portable toilets must be cleaned daily and must be serviced a minimum of one a week.
- .2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition. Have toilets maintained in sanitary conditions under Contract. Clean and disinfect site of the toilets on removal.

## **4. SCAFFOLDING / HOISTING**

### **4.1 DESCRIPTION OF RESPONSIBILITIES**

- .1 Erect scaffolding independent of walls. Use scaffolding so as to interfere as little as possible with the Work. Construct and maintain scaffolding in rigid, secure and safe manner. Remove scaffolding promptly when no longer required. Scaffolding shall permit convenient access to all levels for all workmen and inspection staff. If this scaffolding is erected at a detention facility the scaffolding must be disassembled and stored in a secure location specified by the facilities manager at the end of each Work day.
- .2 The use of heavy machinery, such as cranes are not permitted, due to basement parking roof slab unsuitable to carry heavy loads.
- .3 Scaffolding is to be designed and stamped by a professional engineer registered in the Province of Ontario.

## **5. GENERAL PROTECTION**

### **5.1 DESCRIPTION OF RESPONSIBILITIES**

- .1 Without limiting the Contractor's responsibility to provide all necessary protection, the Contractor shall:
  - .1 Take necessary fire precautions and provide protection required by authorities having jurisdiction. Maintain existing services in working order during construction.
  - .2 Protect material and equipment delivered to the site in TCHC's name for installation in the Work.
- .2 Any Work damaged by failure to provide protection as required or damaged as a result of lack of adequate temporary heat shall be removed and replaced with new, at no additional expense to TCHC.
- .3 Each Section (Sub-contractor) shall avoid damaging the Work of other Sections (Sub-contractors). Conduct the Work and provide protective covering as necessary to meet this requirement. Make good at their own expense any damage resulting from failure to meet this requirement. Protective measures shall be to TCHC's approval.
- .4 Provide all necessary shoring, bracing and sheeting as required for safety and execution of the Work.
- .5 Protect all salvaged materials from damage due to building operations and other causes. Maintain in good condition ready for reinstallation when required.

## **6. TEMPORARY THRESHOLDS**

### **6.1 DESCRIPTION OF RESPONSIBILITIES**

- .1 Provide temporary thresholds at all changes of elevation in public areas during construction period.

## **7. EXISTING SIGNAGE**

### **7.1 DESCRIPTION OF RESPONSIBILITIES**

- .1 Reinstall building signage and directories during construction period prior to installation of final finishes.
- .2 Return to Owner, all Building Signage and Address to be replaced with new, refer to drawings.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 DESCRIPTION OF RESPONSIBILITIES**

- .1 Accept responsibility for all temporary structures and comply with applicable rules and regulations. Pay all taxes and all other charges.
- .2 The expression "provide" shall be deemed to include the provision, installation and finishing, maintenance, servicing and removal of the work described. All Work damaged by temporary installations shall be repaired and made good at no expense to TCHC.
- .3 Maintain temporary facilities in good condition.
- .4 When the building is enclosed, if appropriate or if so directed by the Consultant, remove temporary structures and provide equivalent enclosed accommodation within the building.
- .5 On completion, or at earlier date if facility no longer required or if alternative accommodation provided within the building, clear away temporary facilities and make good all Work disturbed.

## **2. TEMPORARY BARRIERS AND ENCLOSURES**

### **2.1 DESCRIPTION OF RESPONSIBILITIES**

- .1 All Work to be so performed so that the TCHC staff and / or their tenants continues to make use of the Building without interruption.
- .2 Neatly construct temporary exterior doors, hang on butts and fit with padlocks.
- .3 Provide temporary partitions and enclosures as required to protect the Work and guard against burglary or malicious damage.
- .4 Provide temporary doors, screens and coverings to maintain the security of premises and afford complete protection from weather.

**END OF THE SECTION**



## **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 RELATED SECTIONS**

- .1 Section 01 45 00 - Quality Control.

### **1.3 REFERENCES**

- .1 Within text of specifications, reference may be made to reference standards.
- .2 Conform to these standards, in whole or in part as specifically requested in specifications.
- .3 If there is question as to whether any product or system is in conformance with applicable standards, Consultant reserves right to have such products or systems tested to prove or disprove conformance.
- .4 The cost for such testing will be borne by Owner in event of conformance with Contract Documents or by Contractor in event of non-conformance.
- .5 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.
- .6 OPSS Ontario Provincial Standard Specifications and OPSD Ontario Provincial Standard Drawings quoted in these specifications are available online at <http://www.raqsa.mto.gov.on.ca/techpubs/ops.nsf/OPSHomepage>.

### **1.4 QUALITY**

- .1 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of Products provided.
- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own

expense and be responsible for delays and expenses caused by rejection.

- .3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Consultant based upon requirements of Contract Documents.
- .4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

### **1.5 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.

### **1.6 METRIC SIZED MATERIALS**

- .1 SI metric units of measurement are used exclusively on the drawings and in the specifications for this project.
- .2 The Contractor is required to provide metric products in the sizes called for in the Contract Documents except where a valid claim can be made that a particular product is not available on the Canadian market.
- .3 Claims for exemptions from use of metric sized products shall be in writing and fully substantiated with supportive documentation. Promptly submit application to Consultant for consideration and ruling. Non-metric sized products may not be used unless Contractor's application has been approved in writing by the Consultant.
- .4 Difficulties caused by the Contractor's lack of planning and effort to obtain modular metric sized products which are available on the Canadian market will not be considered sufficient reasons for claiming that they cannot be provided.
- .5 Claims for additional costs due to provision of specified modular metric sized products

will not be considered.

### **1.7 STORAGE, HANDLING AND PROTECTION**

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

### **1.8 TRANSPORTATION**

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

### **1.9 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 reinstallation at no increase in Contract Price or Contract Time.

#### **1.10 QUALITY OF WORK**

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

#### **1.11 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.

#### **1.12 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.

#### **1.13 REMEDIAL WORK**

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

#### **1.14 LOCATION OF FIXTURES**

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.

- .2 Inform Consultant of conflicting installation. Install as directed.

#### **1.15 FASTENINGS**

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

#### **1.16 FASTENINGS – EQUIPMENT**

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No.304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

#### **1.17 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.

#### **1.18 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.
- .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**

## **1. GENERAL**

### **1.1 SECTION INCLUDES**

- .1 Project Cleanliness
- .2 Final cleaning.

### **1.2 REFERENCE STANDARDS**

- .1 Canadian Construction Documents Committee (CCDC)
- .2 CCDC 2 - 2008, Stipulated Price Contract.

## **2. PROJECT CLEANLINESS**

### **2.1 DESCRIPTION OF RESPONSIBILITIES**

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by TCHC tenants, or by other Contractors.
- .2 Remove waste materials from site at regularly scheduled times or dispose of as directed by TCHC.
- .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 offsite.
- .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 c will not fall on wet, newly painted surfaces nor contaminate building systems.

### **3. FINAL CLEANING**

#### **3.1 DESCRIPTION OF RESPONSIBILITIES**

- .1 Refer to CCDC 2 – 2008 Paragraph GC 3.13 and the corresponding Supplementary Conditions.
- .2 When Work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .3 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .4 Prior to final review, remove surplus products, tools, construction machinery and equipment.
- .5 Remove waste products and debris other than that caused by TCHC tenants, or other Contractors.
- .6 Remove waste materials from site at regularly scheduled times or dispose of as directed by TCHC.
- .7 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .8 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and Canadian National Cleaning Section 01740 Master Construction Page 3 Specification 2001-12-31.
- .9 Mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .10 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.
- .11 Clean lighting reflectors, lenses, and other lighting surfaces.
- .12 Vacuum clean and dust building interiors, behind grilles, louvers and screens.
- .13 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.
- .14 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .15 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .16 Remove dirt and other disfiguration from exterior surfaces.
- .17 Clean and sweep roofs, gutters, areaways, and sunken wells.
- .18 Sweep and wash clean paved areas.
- .19 Clean equipment and fixtures to a sanitary condition; clean or replace filters of mechanical equipment.



- .20 Clean roofs, downspouts, and drainage systems.
- .21 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
- .22 Remove snow and ice from access to building.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 REFERENCES**

- .1 Environmental Protection Act, Ontario Regulation 102/94 and Ontario Regulation 103/94.
- .2 Canadian Construction Association:
  - .1 CCA 27-1997, A Guide on Construction Environmental Management Planning
  - .2 CCA 81-2001, A Best Practices Guide to Solid Waste Reduction

### **1.2 DEFINITIONS**

- .1 Construction Waste Management Plan: This document consists of the Waste Reduction Workplan (WRW) and the Materials Source Separation Program.
- .2 Inert Fill: inert waste, exclusively asphalt and concrete.
- .3 Materials Source Separation Program (MSSP): a program outlining a series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
- .4 Recyclable: ability of product or material to be recovered at the end of its life cycle and re-manufactured into new product.
- .5 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being re-manufactured into new product.
- .6 Reuse: repeated use of product in the same form but not necessarily the same purpose.
  - .1 Wood pallets
  - .2 Crushed concrete for clean fill
- .7 Source Separation: act of keeping different waste types separate for distribution into appropriate recycling/disposal bins.
- .8 Waste Management Coordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating submittal and reporting duties.
- .9 Waste Management Log: a running log that documents the status of construction waste diversion rates and totals.
- .10 Waste Reduction Workplan (WRW): a report addressing opportunities for reduction, reuse, and recycling of construction wastes, to be followed throughout the construction process.

### **1.3 DESCRIPTION OF RESPONSIBILITIES**

- .1 The Contractor is responsible for supplying dumpster(s) and for all associated costs for these dumpster(s) (including all cost for the legal processing and disposal of all of the waste) to be used for the disposal of construction and / or demolition waste materials. Separate dumpsters must be supplied for general waste, recyclable waste and hazardous waste.
- .2 Whenever possible, space will be made available for the dumpster(s). All waste created by the Contractor and / or the Sub-Contractors must be disposed of in the dumpster (s) supplied by the Contractor. No construction and / or demolition waste is to be disposed of in any other manner.
- .3 The Contractor is responsible for ensuring that all waste materials are separated into the categories of general waste, recyclable waste and hazardous waste and are stored, while on the construction site, in separate dumpsters.
- .4 The Contractor is responsible for ensuring that the dumpsters are properly removed from site once a dumpster is full and at the end of the project.
- .5 The Contractor is responsible for ensuring that all waste is properly and legally handled, transported and processed by the waste disposal service that the Contractor has contracted with. This includes, but is not limited to, ensuring that recyclable waste is properly recycled and hazardous waste is disposed of in accordance to the laws of the Province of Ontario and the laws of Canada and regulations, by-laws and municipal statutes of other authorities having jurisdiction including the latest amendments thereto.
- .6 The Contractor is responsible for ensuring that all waste created by the construction and / or demolition is removed from the construction site at the end of each shift and properly disposed of in the dumpsters supplied by the Contractor.
- .7 Disposal of waste or volatile materials, such as mineral spirits, oil or paint thinner into storm or sanitary sewers prohibited.

### **1.4 SUBMITTALS**

- .1 Prior to start of construction, prepare and submit, prior to project start-up, 2 copies of the Construction Waste Management Plan, including:
  - .1 Waste Reduction Workplan
  - .2 Materials Source Separation Plan
  - .3 Sample Waste Management Logs

- .4 For each material reused, sold or recycled, include supporting letters on the end use of materials from the waste management firms.
- .2 Concurrent with each Application for Payment provide the following:
  - .1 Monthly Waste Management Log, including:
    - .1 Construction Waste Tracking sheet detailing waste tracking information for each shipment. The tracking sheet must indicate the date, type of waste, receiving facility, weight of waste, weight diverted, waybill ticket # and diversion rate of each shipment.
    - .2 Waybills indicating tonnes of waste removed from site and location where waste was taken.
      - .1 Commingled bins to indicate breakdown of material type.
    - .3 Summary Construction Waste report outlining the project's most current total diversion rate, broken down by major materials.

#### **1.5 WASTE REDUCTION WORKPLAN (WRW)**

- .1 WRW to be prepared prior to project start-up.
- .2 WRW to include but not be limited to:
  - .1 Destination of materials
  - .2 Security
  - .3 Protection
  - .4 Clear labelling of storage areas
  - .5 Details on materials handling and removal
  - .6 Quantities of materials to be salvaged for reuse or recycling, and materials sent to landfill.
- .3 Identify opportunities for reduction, reuse and recycling of materials.
- .4 Set realistic goals for waste reduction, recognize existing barriers and develop strategies to overcome these obstacles.
- .5 Monitor and report on waste reduction by providing Waste Management Logs as per 1.4.2.1.

#### **1.6 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)**

- .1 MSSP to be prepared prior to project start-up.

- .2 Implement MSSP for waste generated on site in compliance with approved methods and as reviewed by Departmental Representative.
- .3 Provide conveniently-located, on-site facilities for collection, handling and storage of anticipated quantities of reusable, recyclable and waste materials.

#### **1.7 STORAGE, HANDLING AND PROTECTION**

- .1 Store materials for reuse and recycling in locations as directed by Departmental Representative.
- .2 Unless otherwise indicated, materials for removal are the property of the Contractor.
- .3 Prevent contamination of materials for reuse and recycling by handling in accordance with requirements for acceptance by designated facilities.

#### **1.8 WASTE DISPOSAL**

- .1 Do not bury rubbish or waste materials.
- .2 Hazardous materials to be separated from landfill waste and disposed of appropriately.
- .3 Keep records of construction waste:
  - .1 Number and size of bins
  - .2 Waste type per bin
  - .3 Total weight in tonnes of landfill waste.
  - .4 Total weight in tonnes of hazardous waste.
  - .5 Total weight in tonnes of reused materials.
  - .6 Total weight in tonnes of recycled materials.
  - .7 Destination of all materials.
- .4 Prepare project summary with regards to quantities and destination on a material by-material basis.
- .5 On site sales are not permitted.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 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 Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
  - .2 Request Departmental Representative's Inspection.
- .2 Departmental Representative's Inspection: Departmental Representative 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 Fire Commissioner, Utility companies, other Authorities having Jurisdiction 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 the Departmental Representative, and Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.

### **1.2 RECORD DRAWINGS AND SPECIFICATIONS**

- .1 Keep 1 set of printed Drawings and Specifications on site for use in maintaining record information. Ensure these Drawings and Specifications are kept on site at all times available for review by Owner and/or Consultant at any given time.
- .2 Accurately and neatly record deviations from Contract Documents, including addenda, Supplemental Instructions and Change Orders, caused by site conditions.
- .3 Record information concurrently with construction progress. Do not conceal actual work until required information is recorded.
- .4 Legibly indicate each item to record actual construction including field changes of dimensions and details, and details or information not on original Drawings.

- .5 Catalogue field review reports and cross reference to relevant trade, building area and component. Submit inspection and testing reports in accordance with requirements of Specifications. Highlight unsatisfactory inspection and testing results with any Supplemental Instructions issued by Consultant.
- .6 Identify Drawings as "Project Record Copy", maintained and available for inspection on site by Consultant.
- .7 Prior to applying for Certificate of Substantial Performance submit record Drawings and Specifications to Consultant in paper and electronic format.

### **1.3 TAKE OVER PROCEDURE**

- .1 Contractors Inspection
  - .1 The Contractor and his Sub-contractors shall conduct an inspection of Work, and correct all deficiencies.
- .2 Substantial Performance
  - .1 Refer to the CCDC 2 – 2008 Stipulated Price Contract Paragraph GC 5.4 Substantial Performance of work and the CCDC 2 – 2008 Supplementary Conditions Paragraph GC 5.4 Substantial Performance of work.
- .3 Deficiencies
  - .1 During the "Consultant's Review" a list of all deficiencies shall be drawn up and signed by the Consultant or the Owner. The Contractor shall correct all deficiencies in a satisfactory manner.
- .4 Final Inspection
  - .1 When the Contractor is satisfied that all deficiencies have been corrected, the Contractor shall request, in writing, a Final Inspection. The Final Inspection Team shall consist of the Consultant, the Contractor and TCHC project Team.
- .5 Certificate of Substantial Performance
  - .1 Refer to the CCDC 2 – 2008 Stipulated Price Contract Paragraph GC 5.4 Substantial Performance of work and the CCDC 2 – 2008 Supplementary Conditions Paragraph GC 5.4 Substantial Performance of work. Publication of Substantial Performance is not required for construction contracts of less than \$100,000.
- .6 Operations and Maintenance Manuals
  - .1 All documentation to be in English and consist of one (1) binder and electronic copy (PDF).

- .2 Contents
  - .1 Table of Contents to include but not limited to: Project Name, Contact information of Contractor, Construction Manager and Sub-Contractors.
  - .2 For each Product or System: List names and contact information of Sub-Contractors, Suppliers and service Representatives, including local source of replacement supplies and parts.
  - .3 Warranties are between the Sub-Contractors and TCHC.
  - .4 Warranties to include: Description of the warranty coverage, date warranty starts, date warranty expires, contact info of the Sub-Contractor providing the warranty.
  - .5 Reports.
  - .6 Drawings: Arch E size 36"x48".
  - .7 Organize contents into applicable sections of work to parallel project specifications breakdown. Mark each section by labeled tabs protected by celluloid covers fastened to hard paper dividing sheets. Highlight on the documentation provided, the materials, products and equipment installed.
- .7 Record Drawings
  - .1 Prepare all required drawings in CAD, version compatible with AutoCAD 2011.
  - .2 Maintain record drawings up to date as Work progresses. Status of up to date record drawings will be considered as condition to approve application for progress payments.
  - .3 Authorized deviations from drawings to be marked in red accurately on one set of drawings prints, signed and dated by Contractor or Sub-Contractor.
  - .4 Record accurately:
    - .1 Locations of concealed structure, mechanical and electrical services and similar Work not clearly in view.
    - .2 Location of equipment bases, anchors, concrete pads and roof curbs, sleeves, piping, conduits, ducts, maintenance holes and valves and others, located either below, outside or within structure.
    - .3 Include one complete set of final shop drawings (electronic copy and hard copy) including corrections and changes made during fabrication and installation.
  - .5 All project close-out activities must be completed within 21 calendar days after substantial completion.

**END OF THE SECTION**



## 1. GENERAL

### 1.1 DEMONSTRATION AND TRAINING

#### .1 INSTRUCTIONS

- .1 Thoroughly instruct Building Management authorized representative(s) in safe operation of systems and equipment after installation of Work. Coordinate with TCHC and arrange commissioning programme and schedule for instruction times. Submit a commissioning plan and schedule with TCHC within sixty (60) days following award of contract.
- .2 Arrange and pay for services of qualified service engineers and manufacturers' representatives to instruct Building Management staff on specialized portions of installation, such as refrigeration machines, boilers, automatic controls and water treatment, and as directed by TCHC.
- .3 Submit a complete record of instructions as part of maintenance instructions and data book given to TCHC. For each instructional period, supply following data:
  1. date
  2. system or equipment involved
  3. names of persons giving instructions
  4. names of persons being instructed
  5. other persons present
- .4 Carry out instructional period as per schedule and agreed with TCHC.
- .5 Permit Building Management authorized representative(s) usage of systems prior to Substantial Performance for purpose of testing and learning operational procedures. This usage shall not affect warranties and no claim for damage shall be made against Building Management and their authorized representative(s) for any injury or breakage to any part or parts of above due to aforementioned tests, where such injuries or breakage are caused by a weakness or inadequacy of parts, or by defective materials or quality of performance of any kind.
- .6 At end of training, obtain and submit to TCHC, signature of Building Management authorized representative(s) stating that they understand system and equipment installation, operation and maintenance requirements.
- .7 Obtain and submit to TCHC, letters from manufacturers of equipment and systems indicating that their technical representatives have inspected and tested equipment and systems installed and have approved methods of installation, connections and

operation.

- .8 Only exception to foregoing requirements for acceptance of equipment and systems, will be 'fine tuning' which may be performed prior to Completion of Contract.
- .9 In conjunction with foregoing requirements, the Contractor shall arrange necessary inspections and obtain written approval and acceptance of equipment and systems requiring approval by authorities having jurisdiction, and subsequent correction of those unacceptable items to satisfaction of such authorities.

**END OF THE SECTION**

## 1. GENERAL

1.1 The Contractor must provide all labour, materials, products, equipment and services for commissioning of all building systems to ensure building is operating according to requirements of Contract Documents.

## 1.2 COMMISSIONING

### .1 Commissioning Summary

- .1 Commissioning activities shall be performed in accordance with requirements of Contract Documents and shall include, but are not limited to following:
- .2 Commissioning process shall be performed by the Contractor, in accordance with Contract Documents. Commissioning shall be demonstrated to satisfaction of the Owner. Include all quality assurance and control activities as commissioning, including the enclosure (the new cladding).
- .3 Commissioning performed by the Contractor on all building items, components, and systems unless otherwise stated, which, is a prerequisite requirement for application of Substantial Performance. It shall include without limitation activities such as startup, verification, adjusting and balancing, demonstration and instructions of Building Management authorized representative(s) or other personnel designated by Building Management regarding each building system;
- .4 Commissioning performed by the Contractor after Substantial Performance, which includes without limitation activities such as training and fine tuning of building systems through all seasonal occupancy, or other operational conditions to achieve requirements of Contract Documents during twelve (12) months following Substantial Performance to end of Work (as per the Master Services Agreement).
- .5 Commissioning shall include systematic testing, documentation of system in all scope of operations and providing performance data. Provide complete description of all systems operation as well as equipment and material information. Perform additional testing as requested by the Owner to verify results without any extra cost.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 GENERAL INSTRUCTION**

- .1 Read and conform to:
  - .1 The General Conditions of the Contract CCDC 2,
  - .2 Supplementary Conditions to CCDC 2,
  - .3 The Sections of Division 1.
- .2 All work of this Section to conform to the appropriate requirements of the most recent edition of the Ontario Building Code.
- .3 Conform to all fire safety regulations and procedures required by Construction Safety Act of Ontario, Ontario Building Code and Municipal Authorities having jurisdiction.
- .4 Coordinate work of this Section, and with other related sections, to ensure satisfactory and expeditious completion of the Work.
- .5 Review and update all work schedules with Consultant on a regular basis.
- .6 Examine the Work of this, and all related sections, to confirm the extent, location, quality, and condition prior to commencing.
- .7 Discontinue work during severe rain, wind, heat, cold, or other such inclement weather and monitor time lost in relation to Environment Canada daily norms. Lost time will only be considered where actual conditions exceed norms.

### **1.2 RELATED SECTIONS**

- .1 Section 04 20 00: Unit Masonry
- .2 Section 05 41 00: Structural Steel Stud Framing System
- .3 Section 05 50 00: Metal Fabrications
- .4 Section 06 10 00: Carpentry.
- .5 Section 07 20 00: Insulation
- .6 Section 07 21 19: Spray-in-place Urethane Foam Insulation
- .7 Section 07 27 00: Air / Vapour Barrier
- .8 Section 07 42 00: Wall Panels
- .9 Section 07 46 19: Steel Siding
- .10 Section 07 48 13: Thermally Broken Rain Screen Attachment System
- .11 Section 07 52 00: Membrane Roofing - SBS
- .12 Section 07 62 00: Sheet Metal Flashing and Trim
- .13 Section 07 90 00: Joint Sealants.
- .14 Section 08 17 13: Entry Doors and Frames.

- .15 Section 08 42 00: Fibreglass Window
- .16 Section 09 25 00: Gypsum Wallboard
- .17 Section 09 91 00: Painting

### **1.3 SUMMARY**

- .1 Work Included:
  - .1 Furnish all labour, materials, equipment and services necessary to perform the Work of this Section as indicated and as specified herein.
  - .2 Remove and dispose of materials indicated on the drawings and required including, but not necessarily limited to:
    - .1 Existing roofs, parapets, underlayment, insulation, flashings, static vents, penetration sleeves, roof caps. Existing roof deck and below to be maintained and remained.
    - .2 Existing eaves troughs and downspouts.
    - .3 Existing deteriorated sheathing and carpentry items.
    - .4 Existing sheathing, interior drywall, steel chain, and stud framing (windows addition and removal) on trapezoid bedroom projections.
    - .5 Existing metal siding (complete with existing insulation).
    - .6 Existing stucco and cementitious stucco cladding for attachment of vapour barrier, insulation, and thermal clips.
    - .7 Existing eaves troughs and rain water leader.
    - .8 Existing sealant materials.
    - .9 Existing garbage enclosure.
    - .10 Existing garage doors, complete with their mechanisms.
    - .11 Existing man-doors, complete with their hardwares, located adjacent to garage doors, and on exterior stair enclosures.
  - .2 Temporary removal of mechanical, electrical, plumbing equipment and services as required to facilitate re-cladding and replacement of the roofing works.
  - .3 Removal and disposal of existing doors, windows, screens, fasteners, exhaust grilles and rain hoods, caulking and sealant materials from the exterior walls of the buildings as specified and/or indicated.
  - .4 Removal and disposal of existing patio and storm doors from the exterior walls of the building as specified and/or indicated.
  - .5 Temporary protection of exposed wall surfaces and other areas affected by the Work

will only be accepted if it is previously approved by the Consultant and Owner. Anytime a door or window is removed, it must be replaced before the end of the work day. Temporary overnight protection of openings with plywood or tarps will not be permitted.

- .6 Removal and disposal of existing masonry and/or wall assembly at entry door locations to accommodate new door configurations as indicated.
  - .7 Removal and disposal of delaminated or deteriorated brick masonry, concrete block, steel, wood framing from building walls.
  - .8 Removal and disposal of deteriorated steel reinforcement on the Central and South exterior stairs.
  - .9 Removal and disposal of delaminated or deteriorated concrete on the Central and South exterior stairs.
  - .10 Removal and disposal of existing metal siding, building paper, trim, flashings, caulking, etc. attachment to building structure.
  - .11 Temporary removal, protection, and reinstallation of existing adjacent components indicated or required to facilitate the Work, including but not limited to: fences, signs, exhaust vent boxes, louvres, light fixtures, gas lines, mechanical equipment, and other electrical services affected by the work, including security cameras, etc.
  - .12 Provision of temporary shoring and protection off all areas affected by the Work.
  - .13 Disposal of all materials not suitable for reuse.
- .2 Submittals:
- .1 Prior to commencement of the Work, submit drawings showing scaffolding. Install scaffolding in accordance with applicable codes and laws.

#### **1.4 SCHEDULE**

- .1 The Contractor shall allow for co-ordination between trades and sequence of demolition shall strictly comply with the Contractor's Work Schedule.

#### **1.5 QUALITY ASSURANCE**

- .1 This work shall be carried out by qualified and experienced workers.
- .2 Contractor shall specialize in this work with minimum of five (5) years documented experience. Submit verification of experience on request.
- .3 Notify the Consultant for field review of the following:
  - .1 identification of all deteriorated assembly

- .2 completion of removals within designated areas
- .3 completion of surface preparation

## **1.6 EXISTING CONDITIONS**

- .1 Examine existing property properly. Determine nature and extent of materials to be removed or relocated and protection required.
- .2 Examine adjacent properties. Determine extent of protection required.
- .3 Prior to commencement of removal work consult with the Owner, utility companies and municipal authorities to determine the location of existing telephone lines, hydro, gas, sprinklers and other buried and/or concealed services in the work area. Take all reasonable precautions to avoid damage or interruption to existing services. Report any condition that interferes with the Work and provide a minimum of 48 hours' notice of any interruption of service.

*Claims for damage deemed preventable or as a result of the Contractor's failure to report interference will be the Contractor's responsibility.*

- .4 Take over items for removal and repairs in their condition on date that tender is accepted, irrespective of their condition at time of examination prior to tendering.

## **2. PRODUCTS**

### **2.1 MATERIALS**

- .1 All materials, except as noted on drawings and/or specifications to be retained for reuse, to become property of Contractor. Remove from site.
- .2 Remove materials unsuitable for re-use and contaminated and dangerous materials from site and dispose of in safe manner to minimize danger involved at site or at anytime during disposal.
- .3 All materials used for repairs shall match existing quality, to approval of Consultant.

## **3. EXECUTION**

### **3.1 PROTECTION**

- .1 Maintain safe access to building and parking areas so as not to interfere with use by occupants or public.
- .2 The removal and repair of the roofing materials, siding materials and related components will be from an occupied residential building.

Note: apart from the enclosed work site areas the occupants and public will have free

- use of the building and grounds around the Work. It is therefore essential that the work personnel and suppliers take necessary care and provisions for the protection of the occupants and public.
- .3 Take precautions to guard against movement, settlement, damage or collapse of services, streets, walls, structures, sidewalks, driveways, paving, adjacent grades, landscaping including trees, etc., and be liable for any such movement or settlement and any damage or injury caused thereby. Repair promptly such damage when ordered.
  - .4 Confine operations to immediate area of removals and repairs. Take extreme care not to damage existing construction beyond that necessary for carrying out of new work; make good such damage in every respect.
  - .5 Before starting demolition, provide plywood sheathing to protect wall and window surfaces below and adjacent to the work of this Section, including all areas subject to foot traffic.
  - .6 Erect and maintain suitable fences and barricades as required to protect public and occupants.
  - .7 Protect interior and exterior portions of the building from damage due to weather or construction. Protection shall be adequate to provide security.
  - .8 Protect existing adjacent work against damage which might occur from falling debris or other causes due to demolition work.
  - .9 Protect existing trees and provide tree protection barriers as required by the City of Toronto: Tree Protection Policy and Specifications for Construction near Trees.
  - .10 Provide and maintain, in accordance with applicable provincial and municipal regulations, OBC and NBC, all necessary precautions during execution of work to fully protect occupants, public and Owner from loss, damage, death or injury through neglect, carelessness or incompetence of Contractor, his employees, or Subcontractors including the condition or handling of his equipment.
  - .11 Take precautions to support affected structures, and if at any time safety of adjacent sections of building or adjacent structures or services appears to be endangered, cease operations and notify Consultant; take precautions to support the building; do not resume operations until permission is granted by Consultant.

### **3.2 TRAFFIC FLOW**

- .1 Conduct operations in such a manner as not to impede vehicular or pedestrian traffic normal to area adjacent to building or on streets, sidewalks or alleys giving access to



- area or buildings in the neighbourhood.
- .2 Do not place or store materials or equipment in such a way as to obstruct flow of traffic on thoroughfares, streets, sidewalks or space surrounding buildings.
  - .3 Access to building entrances by public and occupants shall be maintained at all times.
  - .4 Access to surface parking areas shall be maintained at all times as indicated in Division 1.

### **3.3 ELECTRICAL CONDUIT**

- .1 Mark out all locations of electrical services contained in or attached to the building wall where locations are known prior to commencing concrete removals.
- .2 Coordinate demolition work to maintain lighting in the building at all times.

### **3.4 BRICK MASONRY AND CONCRETE BLOCK REPAIR**

- .1 Inspect condition of existing brick masonry and concrete block. Replace spalled, loose, missing, incomplete and cracked bricks as directed, or as otherwise required, to facilitate exterior wall repairs as indicated.  
[Coordinate this work with Section 04200]
- .2 Verify with the Consultant all defective areas of mortar joints requiring repointing.  
[Coordinate this work with Section 04200]
- .3 Defective areas of mortar joints include: loose or missing mortar, excessively soft mortar, powdery or crumbling mortar, cracks, voids, stains, efflorescence, and as otherwise deemed by Consultant.
- .4 Mortar abatement is required, as it contains lead (Unit Price).
- .5 Removal methods shall minimize damage to sound masonry that is intended to remain. Take reasonable measures to prevent damage to reinforcing, flashings, or mechanical and electrical services.
- .6 Work in a systematic manner to maintain stability of the walls.
- .7 The Consultant may direct the Contractor to remove additional bricks and concrete blocks in the vicinity of the repair areas to minimize the number of small patches or to investigate the condition of the steel lintels.
- .8 Work will be measured by the Consultant in the presence of the Contractor.

### **3.5 PERFORMANCE**

- .1 Identify all areas for demolition as necessary to complete the Work specified herein and obtain the Consultant's approval prior to proceeding with the Work.
- .2 Extend removals as directed by the Consultant.

- .3 Remove contaminated or dangerous materials from site and legally dispose of in a safe manner to minimize danger involved at site or at any time during disposal. Water debris as required to prevent excessive dirt or dust.
- .4 Materials and debris shall not be stacked in the building to the extent that overloading of any part of the structure will occur or create obstruction or be hazardous to occupants of building.
- .5 Repair and make good all existing work as required due to work of this contract. All repairs to match existing. Do all cutting and patching required for the work of all other trades.
- .6 Removals and repairs shall be carried out in strict accordance with applicable provincial and municipal by-laws and regulations and Part 8 of the National Building Code.
- .7 During removal and repair operations, keep work wetted down thoroughly to prevent dust and dirt rising. Provide water line for this purpose. Furnish connections that may be required. Upon completion, remove temporary water line. Take precautions to avoid water damage during wetting operations.
- .8 Ensure that mechanical and electrical services affected by the work have been disconnected and capped prior to removal operations.
- .9 Repairs to sidewalks, curbs, roads, etc., shall be to Municipal standards.
- .10 Sawcut concrete, asphalt etc., as required to make straight joints with abutting faces. Removal of sidewalk and curbs is to extend to the nearest existing joint
- .11 Remove promptly from site materials not designated to be re-used in the Work.
- .12 At end of each day's work, leave the Work in a safe condition ensuring that no parts of the structure are in danger of collapsing.
- .13 Protect interior portions of the building from exterior elements at all times.
- .14 Debris must be legally disposed of within 10 calendar days of being removed.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 REFERENCES**

- .1 ASTM International
  - .1 ASTM A82/A82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
  - .2 ASTM F593-02(2008), Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
- .2 Canadian Standards Association (CSA)
  - .1 CAN/CSA-A3000-08, Cementitious Materials Compendium.
  - .2 CSA-A23.1-09/A23.2-09, Concrete materials and methods of concrete construction/Test methods and standard practices for concrete.
  - .3 CAN/CSA-A165 Series-04(R2014)
  - .4 CSA A179-04(R2014), Mortar and Grout for Unit Masonry.
  - .5 CAN/CSA-A370-04(R2014), Connectors for Masonry.
  - .6 CAN/CSA-A371-04 (R2014), Masonry Construction for Buildings.
  - .7 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
  - .8 CSA-S304-14, Design of Masonry Structures.
  - .9 CSA W186-M1990 (R2012), Welding of Reinforcing Bars in Reinforced Concrete Constructions.

### **1.2 RELATED SECTIONS**

- .1 Section 02 06 00: Selective Demolition
- .2 Section 05 41 00: Structural Steel Stud Framing System
- .3 Section 05 50 00: Metal Fabrications
- .4 Section 06 10 00: Rough Carpentry.
- .5 Section 07 20 00: Insulation
- .6 Section 07 21 19: Spray-in-place Urethane Foam Insulation
- .7 Section 07 27 00: Air / Vapour Barrier
- .8 Section 07 42 00: Wall Panels
- .9 Section 07 46 19: Steel Siding
- .10 Section 07 48 13: Thermally Broken Rain Screen Attachment System
- .11 Section 07 52 00: Membrane Roofing - SBS
- .12 Section 07 62 00: Sheet Metal Flashing and Trim

- .13 Section 07 90 00: Joint Sealants.
- .14 Section 08 17 13: Entry Doors and Frames.
- .15 Section 08 42 00: Fibreglass Window
- .16 Section 09 25 00: Gypsum Wallboard
- .17 Section 09 91 00: Painting

### **1.3 SUBMITTALS**

- .1 Submit submittals in accordance with Section 01 33 00.
- .2 Product data: Submit product data sheet for each item. Indicate VOC's mortar, grout, colour additives and admixtures.
- .3 Shop Drawings:
  - .1 Submit shop drawings indicating wall sections and details, reinforcing and anchors, special detailing, patterning and locations of control joints.
- .4 Samples:
  - .1 Submit samples of each type and colour of masonry unit used prior to placing order.
  - .2 Submit samples of mortar to match existing mortar.
  - .3 Submit samples of masonry anchors, and ties.
  - .4 Submit 250 x 200 mm samples of dampproof course and flashing.
- .5 Quality control submittals: Submit manufacturer's certificates stating that materials supplied are in accordance with this Specification.

### **1.4 QUALITY ASSURANCE**

- .1 Provide plain and reinforced masonry in accordance with CSA A370, CSA A371, and CSA S304.1.
- .2 Mock-up:
  - .1 Construct one mock-up panel of unit masonry construction, 900 mm wide x 900 mm high in a location accepted by the Consultant.
  - .2 Demonstrate use of reinforcement, ties, through-wall flashing, weep holes, jointing, coursing, coping and sills, mortar, bonding, control joints, and workmanship.
  - .3 Mock-up may form part of Work if accepted by the Consultant. Mock-ups which do not form part of Work are to be removed from Site during final cleanup, or when directed by the Consultant.

## **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle Products in accordance with Section 01 61 00 and as specified herein.
- .2 Deliver prepackaged, dry-blended mortar mix to project site in labelled plastic-lined bags each bearing name and address of manufacturer, production codes or batch numbers, and colour or formula numbers.
- .3 Maintain mortar, grout and packaged materials clean, dry and protected against dampness, freezing, traffic and contamination by foreign materials.
- .4 Comply with CSA A371. Do not use salt or calcium-chloride to remove ice from masonry surfaces.
- .5 Deliver mortar materials in original unbroken and undamaged packages with the maker's name and brand distinctly marked thereon. Prevent damage to units.
- .6 Keep masonry materials free from ice and frost. Keep units protected from concrete, mortar and other materials which could cause staining.

## **1.6 SITE CONDITIONS**

- .1 Do not lay masonry when ambient temperature is at or below 5°C unless temporary protection and heating is maintained until mortar has completely set. Supply and install temporary protection and heating for installed, uncured unit masonry when ambient conditions are at, below, or are likely to go below 5°C, until 7 Days after installation.
- .2 Conform to cold and hot weather masonry requirements of CSA A371 and Recommended Practices of the Ontario Masonry Contractors' Association for cold and hot weather masonry work.

## **2. PRODUCTS**

### **2.1 MATERIALS**

- .1 General: All materials requiring low VOC content limits, such as mortar, grout, colour additives and admixtures, are to be in accordance with Section 01 35 29.06.
- .2 Brick: Extruded, burned clay brick conforming to CAN/CSA-A82.1- M87 (R1992), grade SW. Size, colour(s), coursing, and texture to closely match existing (where visible), as reviewed by Consultant, and as approved by Owner.
- .3 Provide samples for Consultant's approval.
- .4 Wall Ties: "Helifix" 6-mm stainless steel wall ties as manufactured by Helifix North

- America Corp., equivalent helical ties as manufactured by Blok-Lok, or approved alternate.
- .5 Mortar: Conforming to CSA-A179 Mortar and Grout for Unit Masonry as follows:
    - .1 Pre-bagged mortars: Mortartek, 1:1:6 mortar mix, Betomix Plus Type N, King 1-1-6 mortar mix, or approved alternate.
    - .2 Typical applications:
      - 1. Type S: loadbearing walls and typical locations.
    - .3 Exterior non-loadbearing applications:
      - 1. Type N: For use at exterior brick and block.
      - 2. Design: Type "N", minimum compressive strength 5.0 MPa.
    - .4 Aggregate: Conforming to CSA-A82.56 Aggregate for Masonry Mortar, clean and sharp, maximum 80% passing 600 um (No. 30) sieve, maximum 50% passing 300 um (No. 50) sieve.
    - .5 Cement: Conforming to CAN/CSA-A5 Portland Cement, normal Portland.
    - .6 Colour: To closely match existing.
    - .7 Lime: Conforming to ASTM C207-79, Hydrated lime.
    - .8 Mix Formula: The mortar material shall be prepared and mixed to the following ratio of Cement: Lime: Aggregate: 1 part Portland cement to 1 part hydrated lime to 6 parts aggregate.
  - .6 Mixing Water: Clean, potable, and free of deleterious amounts of acids, alkalis, or organic materials.
  - .7 Cleaning Materials: Water, clean and free of deleterious substances.
  - .8 Sealants: As recommended by manufacturer.
  - .9 Water Repellant Coating: As specified in Section 07 19 30.
  - .10 Concrete block to CAN/CSA-A165.1: 190 mm thick, unless otherwise indicated, in sizes as shown on Contract Drawings. Colour: Grey, Standard smooth finish with integral water repellent to yield resistance to water penetration as described herein when tested to ASTM E514/E514M for 72 hours and meeting the following requirements:
    - .1 H/15/A/M, hollow, normal weight for partitions.
    - .2 SF/15/A/M, full solid, normal weight for top course of load bearing walls.
    - .3 Special shapes: provide bullnosed units for exposed corners. Provide purpose-made shapes for lintels and bond beams. Provide additional special shapes as indicated.
  - .11 Grout: 25 Mpa concrete in accordance with CAN/CSA A23.1/A23.2.

- .12 Connectors: to CAN/CSA-A370, minimum Level 2 corrosion protection.
- .13 Reinforcement: Conforming to CSA A370, CSA A371, and ASTM A82.
- .14 Reinforcement to suit intended application.
  - .1 Type 1 (Single wythe):
    - 1. Truss type, galvanized steel wire to ASTM A82/A82M for single wythe masonry walls.
  - .2 Type 2 (cavity wall stud back-up):
    - 1. Anchors fabricated from 1.5 mm plate with 4.76 mm wire, complete with screws.
- .15 Reinforcing bars: to CSA-G30.18, Grade 400, deformed.
- .16 SS bolts, nuts and washers: stainless steel to ASTM F593.
- .17 Cell vent weep-hole ventilator: flexible U.V. resistant polypropylene co-polymer, sized to match masonry units, colours selected from manufacturer's standard range.
- .18 Masonry flashing: 600 g/m<sup>2</sup> copper laminated to fibre reinforced, asphalt impregnated paper.
- .19 Masonry flashing adhesive: fibrated cutback asphalt to CAN/CGSB-37.4.
- .20 Metal flashings: Flashings in accordance with Section 07 62 00, continuous strips with a 19 mm folded drip edge.
- .21 Mortar dropping control device: 250 mm high x thickness to suit the cavity, recycled polyester or high density polyethylene, high density polyethylene woven mesh strips, corrugated cellular polypropylene curve, tabs and corrosion resistant screws.
- .22 Concrete aggregate: to CSA-A23.1/A23.2, 10 mm maximum size.
- .23 Fibre firestopping: bearing ULC label, mineral fibre material capable of being compressed into space at top of masonry partitions.

### **3. EXECUTION**

#### **3.1 EXAMINATION**

- .1 Examine all masonry surfaces to receive elastomeric coating or alternate water repellent coating materials for conformance to recommended surface conditions.
- .2 Do not proceed with coating application until all defects are repaired.
- .3 Commencement of work is acceptance of existing conditions as being suitable for the proper performance of masonry repairs.

*Report in writing to the Consultant any conditions that will adversely affect masonry repairs.*

- .4 Provide swing stage and/or scaffold access to enable Consultant to review conditions in advance of masonry removals and brick replacement.

### **3.2 LOCATION AND DETERMINATION OF UNSOUND AREAS**

- .1 Location and extent of unsound areas shall only be determined subsequent to the full removal of existing masonry materials from designated locations.
- .2 Determine extent of all defective areas of masonry visually and/or by hammer tap and identify with spray paint. Review with Consultant and modify as directed.
- .3 Consultant shall verify all areas of repair and/or removal prior to commencing removal.

### **3.3 GENERAL**

- .1 Generally maintain dimensions, lines, levels and tolerances as provided in Division 01 of this specification.
- .2 Location of brick and alignment of new work will be determined by the use of plumb lines and other devices installed and maintained by the General Contractor.
- .3 Maximum acceptable out-of-plane tolerance is 3 mm in any 2400 mm direction and 3 mm in all new work. Refer to A371-94 for other maximum tolerances and ensure that new work complies.
- .4 Do not use stained, chipped, cracked, scratched, irregularly shaped or otherwise defective brick units where exposed to view.
- .5 Do not butter bed joints or exposed corners, throw mortar into joints, excessively furrow bed joints, or shift units after mortar has taken initial set. Where adjustment must be made after initial mortar set, replace mortar with fresh supply.
- .6 Tool exposed surface of joints to smooth, compressed and uniformly concave profile, closely matching existing, when mortar is "thumb- print" hard. Strike concealed mortar joints flush with trowel where accessible during the Work.
- .7 Remove jointing excess or burrs using trowels or burlap.
- .8 Lay all joints approximately 10 mm thick and solidly filled with mortar except where specifically designated to be left open.
- .9 Remove units that are defective, or designated to be removed to perform the Work, only to the extent necessary to properly carry out the Work.



### 3.4 MIXING AND APPROVAL

- .1 In accordance CAN/CSA-A179.
- .2 Do not commence masonry work until mortar is tested and approved by Consultant.
  - .1 Concrete mix shall attain:
    - .2 25 MPa compressive strength at 28 days.
    - .3 100 mm slump at time of deposit.
- .3 Mortar mix to be batched in strict accordance with the required proportions of “dry” masonry sand, hydrated lime and cement.
- .4 Use a single gauge box for sand to match bagged hydrated lime and cement proportions. Adding sand to the mixer by counting small buckets or shovels full will not be permitted. Maintain strict quality control on the batching.
- .5 Only “dry” masonry sand will be accepted.
- .6 Mortar containing lumps of cement or lime will be rejected.
- .7 Admixtures shall not be added to mortar.
- .8 Colouring pigments shall be added in accordance with manufacturer’s recommendations.
- .9 Mortar should be mixed as follows:
  - .1 All cementitious materials and aggregates should be completely mixed to a homogenous mass with required amount of water to produce the desired workability.
  - .2 The mortar shall be mixed by a mechanical batch mixer for a period of not less than three (3) minutes and no more than five (5) minutes.
- .10 Discard mortar not used and placed within 1 1/2 hours after mixing.

### 3.5 BRICK REPLACEMENT

- .1 Inspect condition of brick masonry and replace spalled, loose, missing, incomplete and cracked bricks as directed, or as otherwise required, to facilitate exterior wall repairs as indicated.

*Carefully remove cracked, loose, or spalled brick masonry units.*
- .2 Tap masonry units around cracked, loose or spalled brickwork to ensure that all surrounding masonry is sound. Remove and replace all unsound units. Clean cavity where masonry is removed of all loose debris.
- .3 Work in a systematic manner to maintain stability of the walls and piers.
- .4 Make cuts straight, clean and free from uneven edges. Do not damage adjacent brick or

- mortar materials.
- .5 Clean out voids of all loose particles and mortar dust using suitable brushes, water spray, or compressed air as required.
  - .6 Wet existing and adjacent units as required to control initial rate of absorption.
  - .7 Install replacement units in an evenly filled mortar bed. Units shall be set true and level matching exactly the existing bond pattern and coursing throughout.
  - .8 All joints shall be solidly filled with mortar, and joint widths shall match existing work. Joints are to be squeezed tight; slushing of joints will not be permitted.
  - .9 Replacement brick units shall closely match the original brick masonry in size, colour, and texture where exposed.
  - .10 Complete all masonry repairs before commencing repointing. Joints in repaired areas are to be raked back 20 mm and allowed to set and dry for at least 72 hours to allow shrinkage to take place.

### **3.6 REPOINTING**

- .1 The Contractor shall verify with the Consultant all areas of removal involved prior to commencing removal.
- .2 Cut out all defective mortar joints to a minimum depth of 20 mm and as deep and to the extent required to completely eliminate the defect.
- .3 Defects include: Loose or missing mortar, excessively soft mortar, powdery or crumbling mortar, cracks, voids, stains, efflorescence, and as otherwise deemed by Consultant.
- .4 Sound mortar joints are to be protected and left in their original state. Repair damage to sound mortar joints at no cost to the Owner.
- .5 Use caution when cutting out defective mortar joints to avoid damaging brick units. Use manual cutting techniques where required. Replace brick units damaged by cutting procedure at no cost to Owner.
- .6 Clean cut out joints of loose particles and mortar dust using suitable brushes, water spray, or compressed air as required.
- .7 Wet existing brick units only to the extent necessary to control initial rate of absorption immediately before installing repointing mortar.
- .8 Build up repointing mortar in joints in layers not exceeding 6 mm in depth. The bottom layers must be allowed to set before subsequent layers of mortar are applied.
- .9 Tool head joints first and avoid over-working of all joints.
- .10 All jointing tools to be sized to eliminate variations in finished surfaces.

### 3.7 CUTTING

- .1 Cut out neatly for recessed or built-in objects or for openings.
- .2 Make cuts straight clean, and free from uneven edges. Use masonry saw where necessary.

*Cutting is considered incidental to the work and shall be performed at no additional cost.*

### 3.8 BUILDING IN

- .1 Build in items required to be built into masonry necessary for the proper execution of the Work.
- .2 Prevent displacement of built-in items during the Work. Check plumb, location, and alignment, as work progresses and correct as required.
- .3 Brace jambs, heads, and sills of windows and doors to be built in.
- .4 Make cut outs for built-in items straight clean and free from uneven edges.

### 3.9 WALL TIES

- .1 Install wall ties at locations where existing ties are found to be inadequate or missing.
- .2 Maximum spacing of ties to be 400-mm vertically and 600-mm horizontally.
- .3 Obtain Consultant's direction regarding additional ties around masonry openings, on either side of control joints, and as otherwise required.
- .4 Install wall ties in replaced brickwork such that ties are directly aligned with new mortar joints. Ensure that tie is embedded at least 40-mm in new mortar. Provide 15-mm minimum cover to tie ends.
- .5 Install "Helifix" wall ties through existing brickwork at mortar joint locations. Drill clearance hole through exterior brickwork and pilot hole 75 mm into back-up material. Securely drive metal tie into pilot hole. Ensure that ties are sized to a length resulting in minimum 20-mm embedment into mortar joints. Provide 15-mm minimum cover to tie ends. Where required, inject wall tie resin to cover entire surface of tie embedded in brickwork as recommended by wall tie manufacturer. Use repointing mortar over tie ends to match existing materials.

### 3.10 PROTECTION

- .1 Protect in accordance with CAN/CSA-A371, except following requirements supplement Clause 6.7.2:
  - .1 Maintain temperature of mortar between 5°C and 50°C until used.

### **3.11 COLD WEATHER WORK**

- .1 Do not incorporate any frozen materials into the Work.
- .2 Provide heat during weather conditions at, or expected to fall to below, 5°C, and ensure the Work is maintained between 5°C and 40°C on all sides of the Work for a period of at least 72 hours.
- .3 Use only approved smokeless heaters upon request. Provide copies or evidence of such approval.
- .4 Do not scorch or otherwise damage any masonry materials.
- .5 Do not use any admixtures, accelerators, or anti-freeze solutions.
- .6 Provide weather enclosure around mixing areas during weather conditions at, or expected to fall to below, 5°C and provide heat during such times to ensure minimum ambient temperature above 0°C.

### **3.12 HOT WEATHER WORK**

- .1 Protect freshly laid masonry from rapid drying by waterproof non- staining coverings. Provide saturated covers as required.
- .2 Limit mortar bed preparation to maximum 1000 mm during periods where masonry surface temperatures are at, or are expected to rise above, 40°C.
- .3 Set units immediately and rapidly after spreading mortar beds and while mortar has excellent plasticity.
- .4 Provide shade, wind screens or water sprays as necessary to protect stored materials from hot weather.

### **3.13 WORKMANSHIP**

- .1 Build masonry plumb, level, true to line and with closely aligned vertical joints.
- .2 Layout courses and bond patterns to closely match, or achieve new, uniform coursing and bonding above and below openings, movement joints, and at changes in planes.
- .3 Minimize cutting and use only masonry power saw.
- .4 Only wet bricks which testing indicates have excessively high initial rates of absorption: Wetting to result in uniform saturation and be completed at least 3 hours prior to installation. Do not lay brick units until surface is dry.
- .5 Where applicable, keep "cavity" for drainage layer free of mortar droppings by suitable methods.

### **3.14 INSTALLATION AND WORKMANSHIP**

- .1 Perform masonry Work in accordance with CSA A371 and as indicated.
- .2 Joints of uniform thickness. Tolerances suggested in notes to Clause 7.1 of CAN/CSA-A371 apply.
- .3 Align vertical joints.
- .4 Lay maximum 1800 mm height of masonry per day.
- .5 Cut masonry with power saw.
- .6 Fill space between top of non-bearing partitions, underside of deck and underside of structural members with fibre firestopping compressed as recommended by Manufacturer and requirements of ULC tests. Neatly trim on each side of partitions. Obtain lateral support angles from Section 05 50 01 and install at required spacing.
- .7 Reinforce masonry walls with reinforcing steel as indicated on Drawings. Vertical reinforcing shall be fully grouted in masonry cores with grout.
- .8 Install mineral fibre joint filler between:
  - .1 Exterior masonry walls and columns.
  - .2 Masonry and lintels.
- .9 Do masonry reinforcing, tying and connecting in accordance with CAN/CSA-A370 and CAN/CSA-A371. If there is conflict in the requirements of these two standards, the more stringent requirement shall apply.
- .10 Lightly wet set masonry surfaces before laying abutting masonry.
- .11 Remove surplus mortar and mortar droppings as work progresses.
- .12 Lay blocks in running bond except as indicated otherwise.
- .13 Concave joints, strike joints flush in non-exposed areas or where shown on Contract Drawings.
- .14 Build in items supplied by other sections.
- .15 Fill built-in interior hollow metal frames with mortar.
- .16 Control joints:
  - .1 Provide continuous vertical control joints in block partitions in the following locations:
    1. In new partitions in indicated locations and not spaced farther than 6m O/C.
    2. On each side of column.
    3. Where new partitions abut existing partitions.
  - .2 Stop masonry reinforcement each side of control joint. Keep joint free of mortar.
- .17 Reinforced lintels:

- .1 Install reinforced block lintels at openings.
- .2 Provide minimum bearing of 200 mm at each side of opening.
- .3 Install reinforcing bars and fill with concrete.
- .4 Set block lintels in place using specified mortar.
- .18 Install masonry flashing over foundation walls on which masonry units bear, over lintels built into masonry and above roof flashing where roof abutts masonry.
- .19 Extend masonry flashing beyond exterior face and turn down 45° to form a drip, through outer wythe, up backing material minimum 200 mm and turn into joint at inner wythe. Lap joints 100 mm and apply adhesive.
- .20 Place reinforcing bars in cavities.
- .21 Cell vent weep-hole ventilator in every third vertical block joint at top of block panels where shown on drawings.
- .22 Cell vent weep-hole ventilator in every third vertical block joint at bottom course and first course above lintels.

### **3.15 CLEANING**

- .1 Remove droppings and splashings using clean sponge and water.
- .2 Clean masonry with low pressure clean water and soft natural bristle brush.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21.
- .4 Use bucket and brush hand cleaning with clean water and a stiff brush, and/or pressurized water cleaning not exceeding 2000 psi as necessary.
- .5 Do not use acid solutions.
- .6 Detergents, emulsifying agents, or suitable proprietary compounds will only be considered for approval by Consultant in the event the Contractor determines, by suitable testing methods, at no cost to the Owner, that the chemical composition of such stains requires such compounds. Contractor must also verify that such proposed compound does not adversely affect the long-term performance of any specified or otherwise approved, water-repellent coating or air barrier membrane.
- .7 Allow new brickwork, and all repointing, to set at least seven (7) days prior to initial cleaning.
- .8 Remove larger particles, splatters, or droppings using wooden paddles or other suitable non-metallic tools.

- .9 Protect all adjacent metal, glass, wood, stone, and plastic surfaces. Use masking tape and plastic sheets as required and as directed by Consultant.
- .10 Pre-soak, or saturate, area to be cleaned by thoroughly flushing with clean water from the top down.
- .11 Starting at the top, use clean water and stiff brush to remove stains and small particles.
- .12 Schedule work to avoid prolonged exposure to direct sunlight and excessively hot weather.
- .13 Rinse wall surface by thoroughly flushing from top to bottom with clean water.
- .14 Immediately review with Consultant any stains not adequately removed by cleaning procedures specified

### **3.16 CLEAN UP**

- .1 At the completion of the Work each day remove and properly store all debris, garbage, and excess materials. Regularly and frequently dispose of such material in an approved manner.
- .2 Upon completion of the Work, clean up all debris, excess materials, and equipment and remove from the site.
- .3 Cleaning should be in accordance with the requirements detailed in Section 01 74 00, Cleaning and Waste Management.
- .4 After repointing mortar is firmly set, wash brickwork, working from top to bottom, using suitable water spray and brushes as required.
- .5 Where required, wash adjacent surfaces to remove dust, droppings, smears, and stains caused by Work of this Section.
- .6 Cleaning of tools and equipment to be performed in a manner not causing any damage and in a location acceptable to the Owner.
- .7 Leave work areas in a tidy safe and secure condition at the end of each work period.
- .8 Upon completion of the Work of this Section, leave areas affected in a condition as close to, or better than, original and as acceptable to Owner.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

1. All work of this Section to conform to the appropriate requirements of the most recent edition of the Ontario Building Code.
2. Coordinate work of this Section, and with other related Sections, to ensure satisfactory and expeditious completion of the Work.
3. Review and update all work schedules with Consultant on a regular basis.
4. Examine the Work of this, and all related, Sections to confirm the extent, location, quality, and condition prior to commencing.
5. Discontinue work during severe rain, wind, heat, cold, or other such inclement weather and monitor time lost in relation to Environment Canada daily norms. Lost time will only be considered where actual conditions exceed norms.

### **1.2 RELATED SECTIONS**

- .1 Section 02 06 00: Selective Demolition
- .2 Section 04 20 00: Unit Masonry
- .3 Section 05 41 00: Structural Steel Stud Framing System
- .4 Section 07 42 00: Wall Panels
- .5 Section 07 46 19: Steel Siding
- .6 Section 07 48 13: Thermally Broken Rain Screen Attachment System
- .7 Section 07 52 00: Membrane Roofing - SBS
- .8 Section 07 62 00: Sheet Metal Flashing and Trim
- .9 Section 07 90 00: Joint Sealants.
- .10 Section 08 17 13: Entry Doors and Frames.
- .11 Section 08 42 00: Fibreglass Window
- .12 Section 09 25 00: Gypsum Wallboard
- .13 Section 09 91 00: Painting

### **1.3 REFERENCES**

- .1 American Architectural Manufacturers Association (AAMA):
  - .1 AAMA 2603-02, Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
- .2 American Society for Testing and Materials
  - .1 ASTM A53/A53M-10, Standard Specification for Pipe, Steel, Black and Hot- Dipped,



- Zinc-Coated Welded and Seamless.
- .2 ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - .3 ASTM A193/193M-11a, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications
  - .4 ASTM A269-10, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
  - .5 ASTM A666-10, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
  - .6 ASTM F593-02(2008), Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
- .3 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
  - .2 CAN/CGSB-12.20-M89, Structural Design of Glass for Buildings.
- .4 Canadian Standards Association (CSA)
- .1 CAN/CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction.
  - .2 CSA-G40.20-04(2009)/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .3 CAN/CSA-S16.1-09, Design of Steel Structures.
  - .4 CSA S136.1-07, Commentary on North American Specification for the Design of Cold Formed Steel Structural Members.
  - .5 CSA W47.1-09, Certification of Companies for Fusion Welding of Steel Structures.
  - .6 CSA W59-03(R2008), Welded Steel Construction (Metal Arc Welding) Metric.
  - .7 The Master Painters Institute (MPI)/ Architectural Painting Specification Manual - January 2012.
- .5 The Master Painters Institute (MPI)/ Architectural Painting Specification Manual - January 2012.
- .1 MPI# 79 - Primer, Alkyd, Anti-Corrosive for Metal.
- .6 National Association of Architectural Metal Manufacturers (NAAMM).
- .7 American Society for Testing and Materials International (ASTM)
- .1 ASTM C645-11a, Standard Specification for Nonstructural Steel Framing Members.
  - .2 ASTM A653/A653M-11, Standard Specification for Steel Sheet, Zinc-Coated

(Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

- .3 ASTM A1011/A1011M-10, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
- .4 ASTM C754-11, Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- .8 Design details and connections, where not shown on Drawings, in accordance with CAN/CSA-S16.1 and CSA S136.1.
- .9 Latest published edition of reference standards listed herein are applicable to this project unless otherwise indicated.
- .10 Reference amendments adopted prior to the effective date of this project are applicable unless otherwise indicated.

#### **1.4 SUMMARY**

- .1 Work Included: Provide metal fabrications including but not limited to the following:
  - .1 Exterior handrails, balustrade, and associated metal brackets.
  - .2 Doors, openings, and windows.
  - .3 Lateral support for masonry walls
  - .4 Metal gratings, and grilles.
  - .5 Rain water leaders, scuppers, eavesthrough, and gutters.
  - .6 Roof coping.
  - .7 Miscellaneous sections and framing.
  - .8 Canopy including supports.
  - .9 Exterior cladding.
  - .10 Garbage screen supports.
  - .11 Other metals as shown on the drawings.
  - .12 Related requirements: specifications throughout entirety of Divisions of this project are directly applicable to this section, and this section is directly applicable to them.

#### **1.5 DESIGN REQUIREMENTS**

- .1 Design details and connections, where not shown on Drawings, in accordance with CAN/CSA-S16.1 and CSA S136.1.
- .2 The installer shall allow for co-ordination between trades and shall strictly comply with the installation dates scheduled in this specification.

## **1.6 SUBMITTALS**

- .1 Submit submittals in accordance with Section 01 33 00.
- .2 Product Data: Submit copies of manufacturer's Product data in accordance with Section 01 33 00 indicating:
  - .1 Performance criteria, compliance with appropriate reference standard, characteristics, and limitations.
  - .2 Product transportation, storage, handling and installation requirements.
  - .3 Ensure shop drawings are of one uniform size and based on field measurements.
- .3 Shop drawings: Submit shop drawings in accordance with Section 01 33 00 indicating wall assemblies, suspension systems, adjacent construction, elevations, sections and details, dimensions, thickness, finishes and relationship to adjacent construction:
  - .1 Materials, core thickness, class of finish (AMP 555), number of anchors, supports, reinforcement, details, and accessories.
  - .2 Large scale details of members, materials and connections.
  - .3 Jointing details.
  - .4 Methods of settling, sealing, securing, anchorage.
  - .5 Field connections.
  - .6 Submit shop drawing for following work bearing the stamp of a Professional Engineer registered in the Province of Ontario:
    - .1 Handrails, pipe handrails and balustrades.
    - .2 Canopy and support.
    - .3 Exterior cladding
- .4 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .5 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

## **1.7 QUALITY ASSURANCE**

- .1 Retain a Professional Engineer, licensed in Province of Ontario, with experience in Work of comparable complexity and scope, to perform the following services as part of the Work of this Section:
  - .1 Design components of the work of this section requiring structural performance non-exhaustively including the following:
    - .1 Design stairs' repair including supports.

- .2 Design handrails and railings.
- .3 Design canopy, exterior cladding, and roof.
- .4 Design other components of this section requiring structural performance: metal fabrication items that are required to resist live, dead, lateral, and wind.
- .2 Be responsible for full assemblies and connections.
- .3 Be responsible for determining sizes, joint spacing to allow thermal movement and loading of components in accordance with applicable codes and regulations.
- .4 Be responsible for production and review shop drawings.
- .5 Inspect work of this section during fabrication and erection.
- .6 Stamp and sign each shop drawing.
- .7 Conduct shop and on-site inspections, prepare and submit written inspection reports verifying that this part of Work is in accordance with Contract Documents and reviewed shop drawings.
- .2 Qualifications:
  - .1 Metal Fabricator: Provide Products for Work of this section by manufacturer with minimum 15 years' experience in the manufacture of such materials.
  - .2 Installer's qualifications: Provide work of this section executed by competent installer with minimum 5 years' experience in manufacture. Demonstrate experience of Projects of similar scope and size, and evidence of a continuing quality assurance program for both materials and installation crews.
- .3 Welding:
  - .1 Provide welding in accordance with CSA W59-M performed by a fabricator and mechanics fully approved by the Canadian Welding Bureau as specified herein.
  - .2 Ensure fabricator is fully certified by Canadian Welding Bureau got fusion welding of steel structures to CSA W47.1 and for fusion welding of aluminum to CSA W47.2.
- .4 Perform stainless steel work in accordance with NAAMM, Code of Standard Practice for the Metal Industry, Workmanship, Class 1.
- .5 Certification:
  - .1 Submit certification from registered professional structural Engineer registered in province of Ontario, who shall affix his/her seal and signature to certificate, stating structure is capable of supporting its own weight and specified live loads.
  - .2 Submit certificate from professional Engineer responsible for design which includes field review of this part of the work, validating that work substantially complies with requirements of the OBC and that requisite field reviews have been completed.

- .3 Welders employed on this project may be asked by Consultant at any time for their welding certificate.

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

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .4 Replace defective or damaged materials with new.

## **1.9 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .5 Divert unused gypsum materials from landfill to recycling facility approved by Consultant.

## **2. PRODUCTS**

### **2.1 GENERAL**

- .1 All materials under Work of this Section, including but not limited to, primers and paints are to have low VOC content limits in accordance with Section 01 35 21.01.
- .2 Unless detailed or specified herein, standard products will be acceptable if construction details and installation meet intent of Drawings and Specifications.
- .3 Include all materials, products, accessories, and supplementary parts necessary to complete assembly and installation of Work of this Section.
- .4 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 sharp defined profiles.
- .5 Regulatory Requirements:
  - .1 The work of this section that functions to resist forces imposed by dead and live loads

shall conform to latest requirements of OBC and those of jurisdictional authorities.

- .6 Performance/ Design Criteria:
  - .1 Architectural Drawings and details are diagrammatic and are only intended to show design concept, aesthetics, interfacing requirements, configuration, components, and arrangements. They are not intended to identify or solve completely problems of thermal and structural movements, assembly framing, engineering design, fixings and anchorages.
  - .2 Design work of this section to withstand within acceptable deflection limitations, specified tolerances in vertical and horizontal planes, its own weight, forces applied by movements, of building structure and attached adjacent components, and maximum design loads due to pressure and suction of wind, snow ice, rain and hail.
  - .3 Design stairs in accordance with the OBC, CSA A23.3, CAN/CSA-B65 1 and other requirements of the authorities having jurisdiction.
  - .4 Design load bearing structures to OBC requirements and provide miscellaneous steel supports and anchors to suit design, conform to CAN/CSA-S16.1 and CAN/CSA-S136.
  - .5 Design handrails and guardrails to the requirements of the OBC to withstand the effects of gravity, horizontal and vertical loads as required to design criteria and requirements of authorities having jurisdiction.
    - .1 Engineer metal tube railings and handrails to withstand structural loads indicated and determine allowable design working stresses of metal tube railing and handrail materials based on the following: steel: 72% of minimum yield strength.
    - .2 In no instance shall load design of railings be less than 2.2 kN/m (150lbs/lin.ft) horizontally and 1.5kN/m (100lbs/lin.ft) vertically.
    - .3 Design details and connections in accordance with requirements of CAN/CSA-S16 and CAN/CSA S136, CSA A23.3 to resist forces, moments, shears and allow for movements indicated.
  - .6 Design anchorage inserts for installation as part of other Sections of the Work.
  - .7 Weld connections where possible, otherwise bolt connections. Countersink exposed fastenings, cut off bolts flush with nuts. Make exposed connections of same material, colour and finish as base material on which they occur.
  - .8 Welding of any structural component related to work of this Section shall be executed by fabricator having certification of Division 3, CSA W47.1.
  - .9 Fabricate components carefully and accurately to enable erection within required limits

- so as not to induce excessive stresses, deflection, or distortion into the structure. Do not allow contact between dissimilar materials. Make risers of equal height. Finished components to be rigid, free from discolouration and marks
- .10 Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
    - .1 Temperature Change: 120 °F (67 °C), ambient; 180 °F (100 °C), material surfaces.
  - .11 Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

## **2.2 MATERIALS**

- .1 Stainless steel sheet, strip, plate and flat bar: to ASTM A666, type 304, AISI No. 4 finish. Provide Type 316 stainless steel for exterior applications.
- .2 Stainless steel tubing: to ASTM A269, Type 304, minimum 75% recycled content, seamless or welded with AISI No. 4 finish.
- .3 Steel: to CSA-G40.20/G40.21, Grade 300W:
  - .1 All steel exposed to moisture should be galvanized.
  - .2 All painted galvanized steel, shall be: Swept blast galvanized surface prior to painting, SSPC -SP7. Prime using Amercoat® 385PA High Solids Epoxy (4 mils), and finish with Amershield™ Aliphatic Polyurethane (4mils), or approved alternate materials.
- .4 Powder coating:
  - .1 Epoxy Polyester coating conforming to AAMA 2603. Provide manufacturer's recommended primer.
  - .2 Colour and texture: To be selected by the Departmental Representative.
  - .3 Finishes shall be fully cured and inert at fabricator's shop.
  - .4 Provide samples for each colour and finish for the Departmental Representative's approval.
- .5 Structural Shapes, Plates, Etc.: New material conforming to CSA G40.20 and CSA G40.21, Grade 300W or 350W.
- .6 Hollow Structural Sections: New material conforming to CSA G40.20 and CSA G40.21, Grade 350W, Class H.
- .7 Steel Pipe Handrails: Conforming to ASTM A53M, Type "S", Schedule 40, Grade A steel pipe of sizes shown.

- .8 Uncoated, Cold-Rolled Steel Sheet: ASTM A1008/A 1008M, structural steel, Grade 170, new material, unless another grade is required by design loads; exposed.
- .9 Uncoated, Hot-Rolled Steel Sheet: ASTM A1011/A 1011M, structural steel, Grade 205, new material, unless another grade is required by design loads.
- .10 Galvanizing: Hot dipped galvanizing with minimum zinc coating of 600 g/m<sup>2</sup> to ASTM A153.
- .11 Galvanized Sheet Steel: 0.91 mm (20 ga) core thickness commercial quality to ASTM A653M, Grade A, with Z275 (G90) zinc coating designation to ASTM A653M
- .12 Welding Materials: Conforming to CSA W48.1-M and CSA W59-M.
- .13 Welded Wire Mesh Reinforcement: To ASTM A185/ A185M and ASTM A1064/A 1064M. WWF 51 x 51 x MW9.1 x MW9.1 welded wire mesh reinforcement.
- .14 Steel Welding Materials: To CSA W48.1, CSA W59 and AWS D1.1/D1.1M.
- .15 Fasteners: Supply each type and size of bolt and nut of same manufacture and of same lot.
  - .1 High Strength Bolts: Supply bolts, nuts and washers conforming to ASTM A325M. Supply each type and size of bolt and nut of same manufacture and of same lot.
  - .2 Bolts: ASTM A325/A 325M, Property Class 4.6, Heavy, hexagon head high strength structural bolts, of standard size, of lengths required for thickness of members joined and for type of connection.
  - .3 Nuts: ASTM A563/A 563M, Heavy hexagon semi-finished nuts.
  - .4 Stainless Steel Nuts: ASTM F836M, AISI Type 304 to suit applications.
  - .5 Washers: ASTM F844 and ASME B18.22M, Flat and smooth hardened washers, quenched and tempered to suit applications. For general use bolt, nut and stud application to provide increased bearing surfaces, spacing and to prevent galling. Provide AISI Type 304 stainless steel washers at exterior locations.
  - .6 Hardened Steel Washers: To ASTM F436/F 436M and ASME B18.22M.
  - .7 Lock Washers: To ASME B18.21.2, helical spring type steel "lock" washers to suit applications. Provide AISI Type 304 stainless steel lock washers at exterior locations.
  - .8 Machine Screws: To ASME B18.6.3 and ASME B18.6.7, to suit applications.
  - .9 Machine Screw Nuts: To ASME B18.6.3, to suit applications.
  - .10 Vandal Resistant Fasteners: Dual pin type, Type 304 stainless steel vandal resistant fasteners to suit applications.
  - .11 Drilled Concrete Anchors: To CID A-A-1922A, externally threaded stud with full-length expanding sleeve. Anchor bolt and sleeve assembly with capability to sustain, without



failure, a load equal to four times the load imposed when installed in concrete, as determined by testing according to ASTM E488, conducted by a qualified independent testing agency. Provide AISI Type 304 stainless steel drilled concrete anchors at exterior locations.

- .12 Drilled Masonry Anchors: To CID A-A-1922A, externally threaded stud with full-length expanding sleeve. Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry, as determined by testing according to ASTM E488, conducted by a qualified independent testing agency. Provide AISI Type 304 stainless steel drilled masonry anchors at exterior locations.
- .13 Common or Ordinary Bolts and Anchor Bolts: Unfinished bolts conforming to ASTM A307, Grade A, with hexagon heads and nuts where exposed in the finish work. Supply common bolts of lengths required to suit thickness of material being joined, but not projecting more than 6 mm (1/4") beyond nut, without the use of washers.
- .14 Anchor Bolts: ASTM F1554, Grade 36. Supply anchor bolts of lengths noted, but projecting not less than 13 mm (1/2 inch) beyond nut unless otherwise noted.
- .16 Butyl Tape: AAMA 800, extruded, non-drying, non-skinning, non-oxidizing, reinforced, polyisobutylene butyl tape of sufficient width and thickness, minimum 0.118 inch (3 mm) thick.
- .17 Separator Sheet: ASTM D1330, 0.079 inch (2 mm) thick neoprene sheet.
- .18 Cementitious Grout (Interior Applications Only): ASTM C1107, Grade B and C, pre-mixed, high strength, maximum bearing capacity, non-shrink, cementitious aggregate grout. Provide 'Sika Grout 212' by Sika Canada Inc., or 'Non Shrink Structural Grout - Dry Pack Grout' by Euclid Chemical Company or 'Sealtight CG 86 Construction Grout' by W.R. Meadows.
- .19 Wall Brackets: In accordance with OBC requirements and to meet design requirements indicated on Drawings.

## **2.3 FINISHES**

- .1 Metal Filler: VOC compliant, polyester based metal filler designed for use over iron and steel substrates.
- .2 Interior Steel Primer Paint: VOC compliant, rust inhibiting, modified alkyd resin primer designed for use over iron and steel substrates. Supply "MR053" by Selectone or DuPont "209 Series" as distributed by SWT, or approved alternate.

- .3 Handrail pipe material and finish: provide minimum 3mm wall thickness, type 302 stainless steel, outside diameter: 50mm, provide flossed pipe ends and rind welds smooth.
- .4 Stainless steel finish: CL Blend S.
- .5 Bent plate: 10ga galvanized steel, Z275 coating.
- .6 Galvanized Primer Paint and Field Touch up Paint: ASTM D520, Type III and CAN/CGSB- 1.181, VOC compliant, high zinc-dust content paint for re-galvanizing welds in galvanized steel containing not less than 93% zinc dust by weight. Refer to Section 09 91 00.
- .7 Bituminous Paint: ASTM D1187, Type I or II, VOC compliant, brush or spray grade, non-fibrated, asbestos free, liquid asphalt type emulsion.
- .8 Shop coat primer: to CAN/CGSB-1.40.

## **2.4 FABRICATION**

- .1 Provide hangers, rods, bars, bolts, anchors, brackets, rivets, bearing plates and bracing, fitting, drilling, stopping, soldering, as required for a complete assembly.
- .2 Insulate dissimilar metals to prevent galvanic corrosion. Isolate where necessary to prevent electrolysis due to dissimilar metal-to-metal contact or metal-to-masonry, concrete, plaster and gypsum board. Use two (2) coats of bituminous paint, butyl tape, separator sheet or other means acceptable to the Consultant. Use separator sheet where aluminium is fastened to steel.
- .3 Welding: Cope components at connections to provide close fit. Weld all around at connections. Weld connections unless otherwise indicated.
  - .1 Provide exposed welds continuous.
  - .2 File and grind exposed welds smooth and flush.
  - .3 Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - .4 Obtain fusion without undercut or overlap.
  - .5 Remove flux immediately.
  - .6 At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
  - .7 Grind sharp edges and corners smooth and slightly round. Grind welds smooth.
  - .8 Fabricate joints that will be exposed to weather in a manner to exclude water, or

provide weep holes where water may accumulate

- .4 Provide exposed metal fastenings and accessories of the same material, texture, colour and finish as the base metal to which they are applied or fastened.
- .5 Fabricate metal tube railings and handrails in accordance with reviewed and accepted shop drawings and NAAMM AMP 555, but not less than that required to support structural loads.
  - .1 Form changes in direction as follows: By flush radius bends, or by inserting prefabricated flush radius elbow fittings.
  - .2 Provide wall returns at ends of wall-mounted handrails unless otherwise indicated.  
Close
  - .3 Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work as required, unless otherwise indicated.
    - .1 At brackets and fittings fastened to gypsum board partitions, provide crush-resistant fillers, or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
    - .2 Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
    - .3 For railing posts set in concrete, provide steel sleeves at interior applications and stainless-steel sleeves at exterior applications, not less than 6 inches (150 mm) long with inside dimensions not less than 1/2 inch (13 mm) greater than outside dimensions of post, with metal plate forming bottom closure.
  - .4 Infill Panels: Fabricate infill panels from infill panel as selected by Consultant.
    - .1 Where infill panel selection is vertical steel pickets, provide vertical pickets of 1/2-inch (13 mm) diameter solid steel rod at maximum 4 inches (100 mm) on centres welded top rail and bottom bar with 1/2-inch (13 mm) x 1-inch 25 mm flat steel bottom bar welded to pickets and vertical posts.

### **3. EXECUTION**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously

completed work.

### **3.2 INSTALLATION**

- .1 Verify dimensions at the Place of the Work to ensure work of this Section fits to that of other parts of the Work.
- .2 Where fastenings, anchors, or angles/plates for welding have to be built in by other trades, Supply all necessary templates, instructions and supervise to ensure satisfactory installation. Provide weld plates and anchorages for building in by other Sections as indicated and required.
- .3 Erect handrails of this Section plumb, square, true and level.
- .4 Weld connections between handrails and balusters and in lengths of handrails continuously.
- .5 Ends of tube railings shall have closure plates continuously welded to railing.
- .6 Securely anchor work of this Section and rivet, weld or bolt to structural framing of the building. Where secured to concrete, Provide bolts for setting in concrete. Provide expansion bolt supports to masonry.
- .7 Metal surfaces in contact with concrete, masonry or dissimilar metals shall receive one coat of bituminous paint.
- .8 Grind off surplus welding material smooth and flush. Internal and external corners shall have sharp lines. Remove grind marks.
- .9 Provide necessary fitting, setting and cutting required in connection with the fitting of work of this Section to other parts of the Work.

### **3.3 FINISHING SCHEDULE**

- .1 Provide work of this Section free from:
  - .1 Wrinkles, waves, cracks or other defects which would reduce the strength or mar the appearance of finished work.
  - .2 Distortion, weld splatter, weld burn and defects detrimental to appearance.
- .2 File and grind marks and other imperfections to a smooth surface.
- .3 Touch-up surfaces damaged due to cutting, welding, threading and installation.
- .4 Do not provide trademarks or labels on exposed finished surfaces.
- .5 Interior Finish: Prime paint finish unless indicated otherwise.
- .6 Exterior Finish: Hot-dip galvanized, unless indicated otherwise.
- .7 Surface Preparation:

- .1 Bare Ferrous Metal:
  - .1 Remove rust, grease, oil, and scale.
  - .2 Provide SSPC SP6 Commercial sandblast.
  - .3 Provide SSPC SP10 near White sandblast.
  - .4 Solvent wipe.
- .2 Previously Primed Metal:
  - .1 Remove rust, oil, grease and loose paint.
  - .2 Repair shop prime coat and feather edges.
- .3 Previously Galvanized Metal:
  - .1 Remove oils and passivation coatings.
  - .2 Provide SSPC SP7 Brush sandblast.
  - .3 Apply chemical pre-treatment if necessary for good bond.
  - .4 Touch-up finish: inorganic zinc rich primer conforming to CAN/CGSB-1.171.
- .8 Hot-Dip Galvanizing:
  - .1 After fabrication, hot dip galvanize specific steel items noted on Drawings and/or called for herein. Plug relief vents air tight. After galvanizing, remove plugs, ream holes to proper size and re-tap threads. Straighten shapes and assemblies true to line and plane after galvanizing. Repair damaged galvanized surfaces with "Galvafruid" by W.R. Meadows, or approved alternate, in accordance with manufacturer's printed directions.
  - .2 Galvanize members exposed to elements when in final location; members embedded on exterior side of exterior walls; members imbedded in concrete; members specified in this Section or noted on Drawings.
  - .3 Hot-dip galvanize members, in accordance with requirements of following ASTM standards, with minimum coating weights or thicknesses as specified:
    - .1 Rolled, Pressed and Forged Steel Shapes, Plates, Bars and Strips: ASTM A123M; average weight of zinc coating per sq/ft of actual surface, for 4.8 mm (3/16") and less thickness members 2 ounces, for 6 mm (1/4") and heavier members 2.3 ounces.
    - .2 Miscellaneous Steel Items: ASTM A153M; minimum weight of zinc coating, in ounces per sq ft of surface shall be in accordance with Table 1 of ASTM A153M, for the various classes of materials used on the Project.
    - .3 Steel Sheet: ASTM A653M; weight of zinc coating, per sq ft on both sides of sheet. Coating designation Z 275 (G90,) minimized spangle and chemically treated.

- .9 Prime Paint Finish:
  - .1 Surface Preparation: As specified above.
  - .2 System:
    - .1 1 coat (1 mil) Oil Alkyd: Conform to CAN/CGSB-1.40
    - .2 1 coat (2mil) Epoxy: Conform to CAN/CGSB-1.165-M
    - .3 1 coat (2 mil) Zinc Rich: Conform to CAN/CGSB-1.181
  - .3 Apply prime finish in shop.
  - .4 Touch-up on site with same material.

### **3.4 FIELD QUALITY CONTROL**

- .1 Owner may engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- .2 When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.

### **3.5 CLEANING**

- .1 On completion of installation, carefully clean metal Work. Touch up damaged portions of primed finish coat where necessary.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 REFERENCES**

- .1 American Wood Protection Association (AWPA):
  - .1 AWPA P5-15, Standard for Waterborne Preservatives.
  - .2 AWPA P8-14, Standard for Oil-Borne Preservatives.
- .2 Canadian Standards Association (CSA)
  - .1 CSA O80 Series-08, (R2012) Consolidated - Wood Preservation.
  - .2 CAN/CSA-O86-14, Engineering Design in Wood.
  - .3 CSA O112 Series 10-08 (R2013), Evaluation of Adhesives for Structural Wood Products (Limited Moisture Exposure).
  - .4 CSA O121-08 (R2013), Douglas Fir Plywood.
- .3 National Lumber Grades Authority Standard Grading Rules for Canadian Lumber, 2014.
- .4 South Coast Air Quality Management District (SCAQMD):
  - .1 SCAQMD Rule 1168-11, Adhesive and Sealant Applications.

### **1.2 RELATED SECTIONS**

- .1 Section 02 06 00: Selective Demolition
- .2 Section 04 20 00: Unit Masonry
- .3 Section 05 41 00: Structural Steel Stud Framing System
- .4 Section 05 50 00: Metal Fabrications
- .5 Section 07 20 00: Insulation
- .6 Section 07 21 19: Spray-in-place Urethane Foam Insulation
- .7 Section 07 27 00: Air / Vapour Barrier
- .8 Section 07 42 00: Wall Panels
- .9 Section 07 46 19: Steel Siding
- .10 Section 07 48 13: Thermally Broken Rain Screen Attachment System
- .11 Section 07 52 00: Membrane Roofing - SBS
- .12 Section 07 62 00: Sheet Metal Flashing and Trim
- .13 Section 07 90 00: Joint Sealants.
- .14 Section 08 17 13: Entry Doors and Frames.
- .15 Section 08 42 00: Fibreglass Window
- .16 Section 09 25 00: Gypsum Wallboard
- .17 Section 09 91 00: Painting

### **1.3 SUMMARY**

- .1 Work Included:
  - .1 Furnishing of all labour, materials, equipment and services necessary for the supply and installation of the following rough carpentry:
    - .1 Hoarding and site protection (including plywood or plank protection of existing paving finishes).
    - .2 Screens and barricades.
    - .3 Fire-rated exterior plywood sheathing boards.
    - .4 Pressure treated wood cants.
    - .5 Wood blocking and nailing strips.
    - .6 Wood framing at window modifications.
    - .7 Wood preservative treatment.
    - .8 Painted MDF casings around new doors and windows.
    - .9 As shown and/or described on the drawings and as specified herein.
  - .2 All rough hardware.
  - .3 Remove, relocate, alter and re-install all carpentry items as required for the work or as noted on the drawings.
  - .4 All cutting, fitting and trimming of carpentry items as required by other trades.

### **1.4 SCHEDULE**

- .1 The installer shall allow for co-ordination between trades and shall strictly comply with the installation schedule approved by the Owner.

### **1.5 SUBMITTALS**

- .1 Submit applicable supporting documentation in accordance with Section 01 33 00 for approval of the Consultant.

### **1.6 QUALITY ASSURANCE**

- .1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Lumber and moisture content shall comply with latest published edition of grading rules of National Lumber Grades Authority (NLGA).
- .3 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.
- .4 Lumber defects: Discard wood with defects which will render a piece unable to serve its



intended function. Lumber will be rejected by Consultant for excessive warp, twist, bow, crook, mildew, fungus, or mould, as well as for improper cutting and fitting, whether or not it has been installed.

## **1.7 ENVIRONMENTAL REQUIREMENTS**

- .1 Wood products: Composite wood products must have no added urea-formaldehyde.

## **1.8 SPECIAL HANDLING AND STORAGE**

- .1 Co-ordinate delivery with construction schedule. Protect materials from weather and high humidity while in transit and on job site.
- .2 Keep all materials clearly identified with all grade marks legible.
- .3 Store materials on raised supports.
- .4 Cover materials stored on site with tarpaulins or polyethylene sheets to prevent moisture absorption and impairment of structural and aesthetic properties. Ensure proper ventilation.
- .5 Accessory materials such as preservatives shall be stored at temperatures appropriate for those materials. Follow precautionary statements on product labels for storage and handling before use and make reference to applicable Material Safety Data Sheets.

## **1.9 JOB SITE CONDITIONS**

- .1 Store and install wood only in dry areas where no further installation of moist materials is contemplated such that wood may achieve dimensional stability and tolerances required to ensure accurate installation of later work.

## **2. PRODUCTS**

### **2.1 MATERIALS**

- .1 General:
  - .1 Materials used for Work of this Section are to include, but not be limited to the following criteria:
    - .1 Regionally sourced materials.
    - .2 FSC Certified wood.
    - .3 Low VOC content limits.
    - .4 No added urea-formaldehyde.
  - .2 All materials under Work of this Section, including but not limited to, adhesives are to have low VOC content limits.

- .3 All dimensional lumber and plywood to be FSC certified.
- .4 All composite wood and/or agrifibre products (including core materials) and adhesives used to fabricate laminated assemblies used in building must not contain added urea-formaldehyde.
- .5 Material to be sourced regionally from within 800 km of jobsite wherever possible.
- .2 Plywood Sheathing:
  - .1 Exterior Plywood: 9mm (3/4") thick, waterproof, grade stamped exterior grade Douglas Fir plywood, select grade, un-sanded, conforming to CSA O121-M or CSA O151-M, G1S, T&G, standard construction, laminated with waterproof adhesive, urea formaldehyde free; Select-Tight Face, exterior grade, T&G. Plywood for general construction, Standard Sheathing Grade, Douglas Fir.
  - .2 Interior Locations: minimum 19mm (3/4") thick, unless otherwise indicated.
    - .1 Douglas Fir Plywood: Conforming to CSA O121-M, G1S or G2S.
    - .2 Softwood Plywood: Conforming to CSA O151, G1S or G2S.
  - .3 Panelling: G1S Good One Side Grade, sanded surfaces to Tables E-1 and E-2.
- .3 Wood: S-DRY, graded and stamped to National Lumber Grades Authority, Standard Grading Rules for Canadian Lumber, December 1, 2010, S4S.
  - .1 Studs: spruce, pine or fir (SPF), 121c. "STUD".
  - .2 Blocking, furring, strapping, curbs, nailers, bracing, bridging and cants: No. 2 spruce, pine or fir (SPF), 121c, 121d. and pine, 113d.
- .4 Roof lumber: NLGA, Construction grade light framing, Jack Pine, S4S, pressure treated to CAN/CSA-O80 series using copper based waterborne preservative treatment, impregnated to a net retention of 4 kg/ m3 of preservative unless otherwise specified by preservative manufacturer.
- .5 Fasteners: stainless steel wood screws of size and type to Consultant's approval, to CAN/CSA-086.
- .6 Nails, spikes and staples: to CSA B111-1974; galvanized for exterior work, interior highly humid areas and for treated lumber; plain finish elsewhere. Use spiral thread nails except where otherwise specified. Nails are only permitted for the replacement of damaged framing members
- .7 Rough hardware: bolts, nuts, washers, lags, pins, screws: hot dip galvanized.
- .8 Galvanizing: to CAN/CSA-G164-M92, use galvanized fasteners for exterior work, interior high humidity areas and pressure and/or preservative treated lumber.
- .9 Treated Wood and Plywood:

- .1 Treat wood to resist termites or decay, such treatment shall be in accordance with CSA O80.1-08, "Specification of Treated Wood" Table 2, "Use Categories for Specific Products, Uses and Exposures".
- .2 Water-borne preservative, pressure treated wood: treated with chromated copper arsenate, which shall meet or exceed CAN/CSA-O80 Series-M89. Preservative shall be applied in a closed cylinder by vacuum-pressure process, full cell method. Retention of salts on oxide formulations shall be 3.6 kg per cu. m of wood or to refusal. Pressure treatment for wood shall be "Wolman CCA-Type C" by Koppers-Hickson Canada Ltd., Osmose-Pentox Inc., or approved alternate. Preservatives shall not leech nor bloom under any circumstances.
- .3 Pressure treat structural wood elements such as retaining wall or cribbing with a preservative to resist decay, where the vertical clearance between structural wood elements and the finished ground level is less than 150mm (6").
- .4 Treated Wood and Plywood (Decay and Termite Resistant):
  - .1 Acceptable manufacturer: Koppers Company Inc., Wolmanized, distributed by Hickson Building Products Limited.
  - .2 Acceptable Treatment: Timber Specialties K-33.
  - .3 Provide vacuum/ pressure impregnated lumber treated in accordance with CSA O80-M.
  - .4 Retention/ Penetration Standards: Conform to CSA O80 Series.
  - .5 Provide treated wood kiln dried to maximum 12% moisture content.
  - .6 Cut and liquid wood preservative as recommended by manufacturer of treated wood.
- .10 Fire Treated Wood and Plywood:
  - .1 Acceptable manufacturer: Koppers Company Inc., Dricon, distributed by Hickson Building Products Limited.
  - .2 Acceptable treatment: Timber Specialties Flame Proof LHC.
  - .3 Flame spread: max 25 in 30 mins in accordance with CAN/ULC-S102.
  - .4 Provide fire treated wood kiln dried to max 19% moisture content.
  - .5 Do not resurface or rip fire treated wood if it affects the ULC Label.
  - .6 Interior Fire Retardant Treated Lumber and Plywood: Pressure treated lumber and plywood with fire retardant chemicals to meet Underwriters' Laboratories FR-S rating with surface-burning characteristics rating of 25 or less for flamespread, fuel contributed and smoke developed. Ensure each piece of fire retardant treated lumber and plywood bears UL label or imprint attesting to this rating.

- .11 Composite wood: Fabricated lumber constructed from 50% recycled wood fibre and 50% reclaimed polyethylene. Thicknesses as shown. Colour: To be selected by the Consultant. For use at decking and any additional areas as shown.
- .12 Preservative treated plywood: Douglas Fir to CSA O121, G1S good one side, pressure treated with CCA to CAN/CSA O80.9, minimum retention 4.0 kg/m<sup>3</sup> by assay.
- .13 Glue: waterproof.
- .14 Construction adhesive: to CSA O112 Series, cartridge loaded.
  - .1 Maximum allowable VOC limit 30 g/L, acceptable to authorities having jurisdiction.
  - .2 SCAQMD Rule 1168, Adhesives and Sealants Applications.
- .15 All materials shall be new, straight and clean, of nominal noted on the drawings.
- .16 Wood of same structural components shall be of same species, grade and equally seasoned, processed and stamped at same mill.
- .17 Framing Lumber, unless specified otherwise, to be S4S softwood and moisture content to conform to official grading rules for grades required. Moisture content of lumber at time of building-in shall not exceed 19% in conformance with CAN/CSA-O141.
- .18 Wood cants shall be 100-mm x 100-mm pressure treated lumber.

### **3. EXECUTION**

#### **3.1 SELECTION**

- .1 Carefully select all wood members.
- .2 Discard all wood members with defects, which will render a piece unable to serve its intended function. Lumber may be rejected by Consultant, whether or not it has been installed, for excessive warp, bow, crook, mildew, or mould as well as for improper cutting and fitting.

#### **3.2 PREPARATION**

- .1 Withdraw all existing nail fasteners using pinch bars, pliers and other suitable tools. Do not hammer nails into sheathing or framing members.
- .2 Examine existing framing and new sheathing surfaces and repair damaged, deteriorated or unsuitable framing and sheathing areas prior to commencement of work.
- .3 Consultant shall inspect framing and sheathing. Take up, cut out, or remove portions of sheathing panels or wood framing affected by fungal or insect attack, as directed on site by Consultant.
- .4 Replace cut portions of sheathing panels with panels of equal sectional dimensions, and specified grade. Fasten sheathing to framing with non-corrosive screw fasteners.

- .5 Re-secure loose sheathing and/or blocking. Restore sheathing to a sound and even condition. Replace damaged, warped and deteriorated sheathing or blocking members.
- .6 Install felt flashings up to top of wood cants and curbs around mechanical openings and extend membrane up inside face of parapet and over top to outside face of wall as work progresses.
- .7 All wood nailers, furring strips, blocking, etc., shall be treated with preservative to ensure full protection against rot and decay. Apply preservative in strict accordance with manufacturer's printed literature, prior to the materials being put in place. Treat all surfaces, including freshly cut ends. Do not apply preservative inside building.
- .8 Treat freshly drilled holes and cut ends with brush applied preservative.
- .9 Treat surfaces of materials with wood preservative before installation.
- .10 Apply preservative by dipping or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and 1 minute soak for plywood.
- .11 Provide pressure treatment to materials exterior and materials within an envelope wall or exterior floor assembly.
- .12 Coordinate with other Sections providing blocking, nailing strips and trims as required for installation of work.

### **3.3 INSTALLATION**

- .1 All work shall be in accordance with the best practice by skilled craftsmen specializing in the work specified and the requirements of other trades.
- .2 Be responsible for all methods and safety of construction.
- .3 Make adequate provision for possible erection stresses.
- .4 Construct continuous members from pieces of longest practical length, provide running members full length wherever possible.
- .5 Lay out work carefully and to accommodate work of other trades. Accurately cut and fit.
- .6 Install members true to line, levels and elevations, square and plumb.
- .7 Install flashings as detailed on drawings and as specified.
- .8 Install additional blocking and nailing members, as indicated or otherwise required for attachment to the work of this Section.
- .9 Co-operate with others engaged in work on the building to the end that proper unity of action will assure orderly progress of work to meet construction schedule.
- .10 Supply anchors, bolts and inserts, required for attachment of the work of this Section, to those performing the work of other sections and who are responsible for their installation.
- .11 Include in work rough hardware such as nails, bolts, nuts, washers, screws, clips,

- hangers and connectors required for installation of work.
- .12 Install all materials and components in place true to line, levels and elevations with approved fastening methods. Set up and secure plumb, rigid and square. Space uniformly and provide any necessary shimming to produce a level surface for materials to be attached.
  - .13 Fasten all blocking at centres not exceeding 300-mm. Set materials plumb, level, and anchored securely in place.
  - .14 Do not notch, bore, nor cut structural members for pipes, ducts, conduits or other similar items, except as shown, or as specifically approved in writing by Consultant.
  - .15 Do not regard furring and blocking and other fastening provisions as shown on drawings as exact or complete. Install required provisions for fastening, located and secured to suit site conditions and adequate for intended support.
  - .16 After cutting, drilling and fitting of treated wood and plywood but before installation, apply 1 full coat of wood preservative to exposed surfaces, including ends of blocking, furring, nailers and rough carpentry. Retreat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative or fire retardant before application.
  - .17 Provide fasteners and rough hardware for a rigid and secure installation. In addition to mechanical fastener, place continuous adhesive bead where appropriate in accordance with manufacturer's instructions.
  - .18 Apply wood preservative to wood in contact with roofing, concrete and masonry.
  - .19 Treat surfaces of pressure treated wood and plywood which are cut or bored after pressure treatment with field applied wood preservative.
  - .20 Set items in place plumb, straight and level to a tolerance of 1:600 and rigidly secure in place.
  - .21 Secure exterior work with galvanized or non-ferrous fasteners.
  - .22 Install plywood backboards with countersunk screws.
  - .23 Miscellaneous woodwork:
    - .1 Fit and install wood furring, strapping, grounds and blocking. Adequately size, correctly place and conceal members for finishes, fitments and for Work under other Sections. Do not assume that Drawings show required work exactly or completely. Anchor wood members securely in place.
    - .2 Install rough bucks, nailing strips and linings to rough openings as required for backing for frames and other Work.

- .24 Equipment Mounting Panels:
  - .1 Install wood panels required for mechanical, electrical and communication trades for mounting of controls, panel boards, pull boxes, splitters, switches, wall mounted switch gear, junction boxes, electrical cabinets, data control equipment, disconnect switches, fire alarm control equipment, sound/ communication equipment and other similar devices.
  - .2 Provide 19mm (3/4") thick exposed plywood backboard panels in one piece screw-fastened to fire treated wood strapping. Refer to Electrical drawings for sizes and locations and securely mount panels to wall surfaces.
  - .3 Ensure panel size and mounting height suits mechanical and electrical requirements and are acceptable to Consultant. Provide "fire treated" plywood and apply 1 coat of fire retardant wood preservative to surfaces and edges of plywood panels.
- .25 Except where steel supports are specifically shown, provide wood blocking and supports for fastening of wall mounted accessories. Have respective trades approve the location of such wood blocking.
  - .1 Bolt wood blocking or nailing strips to steel framing.
  - .2 Align and plumb faces of furring and blocking to tolerance of 1:600.
  - .3 Provide all miscellaneous blocking as required for the complete and secure installation of the following, including but not limited to: railings, handrails, signage, etc.
  - .4 Roof woodwork:
    - .1 Install continuous wood nailers around roof perimeters, curbs and roof openings at edges of insulation. Use cadmium plated lag screws for securing wood to concrete as shown. Install cut cant strips and continuous nailers on copings and curbs as detailed.
    - .2 Install continuous wood nailers along roof control joints, building and roof expansion joints as shown. Fasten nailers as specified.
    - .3 Install wood backing, dressed, tapered and recessed slightly below top surface of roof insulation and roof hopper.
    - .4 Fasten roof woodwork at maximum 400 mm O/C in staggered pattern unless noted otherwise.
    - .5 Install roof walkways in coordination with Roofing Section. Set sleepers and cleats on roof during roofing application and before installation of flood coat of asphalt and gravel surfacing.
- .26 Mix intumescent paint coating product to manufacturer's recommendations. Do not thin

or strain. Apply primer and paint coating providing fire resistant barrier in accordance with manufacturer's recommendations to achieve requirements of authorities having jurisdiction. Apply at rate 3.2 sq.m/L (125 sq.ft/gal) to obtain dry film thickness of 10 mil (0.25 mm).

.27 Miscellaneous Interior Carpentry: provide plywood, blocking, furring, nailers, rough carpentry, grounds and nailing strips as indicated or required for proper installation. Provide furring blocking as required to support miscellaneous work indicated on drawings or as required to meet design requirements, this non-exhaustively includes: support for fascia, composite wood panels, wall mounted equipment, crash rails, bumpers, wood blocking required with roofing and exterior walls and other similar locations.

.28 Pressure Treated Wood:

- .1 Provide pressure treated wood members at locations indicated on drawings. In particular, provide pressure treated wood in locations where wood will be in direct contact with earth or concrete and at junction of miscellaneous concrete with elements below grade.
- .2 Provide Jack Pine or Red Pine, pressure treated in accordance with CAN/CSA-O80-M for wood in contact with earth or concrete. Acceptable preservative: Chromated Copper Arsenate (CCA) with net retention of 6.73 kg/m<sup>3</sup> (0.42 lbs/cu ft). Provide wood precut, where practical, prior to preservative treatment.
- .3 Ensure pressure treated lumber cut on site has cut ends treated with copper naphthate based end cut preservative for protection against fungal decay.

### **3.4 CLEAN UP**

- .1 Promptly as work proceeds and at the completion of the work each day clean up.
- .2 Clean all debris, rubbish, garbage, tools, equipment and excess materials from the site.
- .3 Storage of debris will not be allowed overnight.
- .4 Cleaning shall be in accordance with the requirements detailed in Section 01 74 00, Cleaning and Waste Management.

**END OF THE SECTION**



## **1. GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

1. All work of this Section to conform to the appropriate requirements of the most recent edition of the Ontario Building Code.
2. Coordinate work of this Section, and with other related Sections, to ensure satisfactory and expeditious completion of the Work.
3. Review and update all work schedules with Consultant on a regular basis.
4. Examine the Work of this, and all related, Sections to confirm the extent, location, quality, and condition prior to commencing.
5. Discontinue work during severe rain, wind, heat, cold, or other such inclement weather and monitor time lost in relation to Environment Canada daily norms. Lost time will only be considered where actual conditions exceed norms.

### **1.2 RELATED SECTIONS**

- .1 Section 02 06 00: Selective Demolition
- .2 Section 04 20 00: Unit Masonry
- .3 Section 05 41 00: Structural Steel Stud Framing System
- .4 Section 05 50 00: Metal Fabrications
- .5 Section 06 10 00: Carpentry
- .6 Section 07 21 19: Spray-in-place Urethane Foam Insulation
- .7 Section 07 27 00: Air / Vapour Barrier
- .8 Section 07 42 00: Wall Panels
- .9 Section 07 46 19: Steel Siding
- .10 Section 07 48 13: Thermally Broken Rain Screen Attachment System
- .11 Section 07 52 00: Membrane Roofing - SBS
- .12 Section 07 62 00: Sheet Metal Flashing and Trim
- .13 Section 07 90 00: Joint Sealants.
- .14 Section 08 17 13: Entry Doors and Frames.
- .15 Section 08 42 00: Fibreglass Window
- .16 Section 09 25 00: Gypsum Wallboard

### **1.3 SUMMARY**

1. Work Included:
  - .1 Furnishing of all labour, materials, equipment and services necessary for the supply

and installation of the insulation materials to the full extent of the drawings and as specified herein.

- .2 Installation of batt insulation materials adjacent to window and door openings affected by installation procedures.
  - .3 Replacement of damaged and/or ineffective batt and blanket insulation as directed by Consultant.
  - .4 Installation of spray foam polyurethane insulation around perimeter of windows and doors as indicated in the drawings.
  - .5 Re-installation of insulation materials around perimeter of window and/or door openings affected by air/vapour seal membrane installation procedures.
  - .6 Installation of new insulation on the exterior walls at locations of new cladding systems as indicated.
2. Submittals:
- .1 Upon request, submit appropriately sized samples of each type of insulation material, 300 mm x 300 mm, to Consultant for approval.
  - .2 Upon request, submit certified copy of test data from recognized independent testing laboratory confirming performance requirements of insulation materials as specified herein.
  - .3 Before work commences, verify in writing that materials submitted and approved are mutually compatible and are compatible with existing materials. Support verification with manufacturer(s) data and/or certification.
  - .4 If a material submitted and approved is not suitable for verification and/or certification, submit alternate material for verification and certification for review by Consultant and approval by Owner.
  - .5 Upon request, submit material safety data sheets.

#### **1.4 SCHEDULE**

- .1 The installer shall allow for co-ordination between trades and shall strictly comply with the installation dates scheduled in this specification.

#### **1.5 REFERENCES**

- .1 CAN/ULC-S702-97 Standard for Thermal Insulation Mineral Fibre for Buildings.
- .2 CAN/ULC S704-03 Standard for Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced.
- .3 CAN/ULC-S705.1-01 Standard for Thermal Insulation - Spray Applied Rigid Polyurethane

Foam, Medium Density – Material.

- .4 CAN/ULC-S711.1-05 Standard for Thermal Insulation - Bead-Applied Two Component Polyurethane Air Sealant Foam, Part 1: Material Specification.
- .5 CAN/ULC-S711.2-05 Standard for Thermal Insulation - Bead-Applied Two Component Polyurethane Air Sealant Foam, Part 2: Installation.

## **1.6 QUALITY ASSURANCE**

- .1 All insulation materials and accessories shall be applied by a contractor approved by the manufacturer. Provide written evidence of approval from manufacturer upon request.
- .2 Qualified and experienced workers shall carry out this work. Installers of sprayed insulation shall be certified in the application of foam-in-place polyurethane foam materials.
- .3 Independent Inspection and Testing:
  - .1 Owner may retain an independent Consultant to carry out periodic supervision during construction. If requested by Consultant, contractor to take cut-test samples of assembly, identify locations and submit to Consultant for review and testing.
  - .2 Employment of Inspection and Testing agencies does not relieve the Contractor's responsibility to perform work in accordance with the Contract Documents.
  - .3 Provide assistance required for executing Inspection and Testing by the appointed agencies and/or the Consultant.
  - .4 Allow Inspection and Testing agencies and/or the Consultant access to the work.
  - .5 If required by the Inspection and Testing agency or by the Consultant, provide cuts for testing. Repair cuts without cost to the Owner.
  - .6 Contractor shall make an allowance for minimum one cut test per day and all required patching to match existing assembly.
  - .7 Failed test results will require remedial work acceptable to Consultant and may entail complete removal and replacement of failed areas.
  - .8 Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- .4 Installation of insulation materials shall be inspected as required prior to, during and upon completion by a representative of the manufacturer to ensure compliance with the specifications and the manufacturer's published guidelines. Written copies of such inspections shall be provided by the manufacturer when requested and/or deemed necessary.

- .5 Upon request, demonstrate for the Consultant the installation procedures relating to the application of the spray foam insulation.
- .6 Arrange for the foam insulation manufacturer's technical representative to:
  - .1 Meet at the site and discuss the installation procedures and unique conditions.
  - .2 Inspect substrate surfaces prior to commencement of work, and certify acceptability of substrate conditions.
  - .3 Provide written recommendations regarding any adverse conditions, including measures to ensure bonding of foam insulation to substrate surfaces.

### **1.7 JOB MOCK-UP**

- .1 Provide mock-up of insulation.
- .2 Erect mock-up(s), as directed by Consultant, to show examples of each material specified in relation to the finished work. Construct additional mock-up(s) if required to show concealed work or illustrate combinations of materials.
  - .1 Demonstrate finish, colours, typical connections of the project, and quality of workmanship.
  - .2 Approved mock-ups may form part of finished work if left undisturbed at time of Substantial Performance of the work. Remove and dispose of mock-ups which do not form part of Work.

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

- .1 Deliver all materials in original, unopened packaging with the manufacturer's labels intact.
- .2 Ensure that all Material Safety Data Sheets and Labels, required by the Workplace Hazardous Materials Information System (WHMIS) Regulation, are in plain view and/or readily obtained.
- .3 Store all insulation materials at temperatures that will not adversely affect their performance characteristics.
- .4 Store all materials in such a manner so as to protect them from precipitation, ground moisture, temperature extremes, sunlight and construction activities by use of weatherproof coverings and raised platforms. Interior storage shall be employed when and where necessary, with the express written consent of the Owner.
- .5 Should storage on site become necessary, follow manufacturer's storage recommendations.
- .6 Obtain Owner's approval of the location and extent of all on-site storage areas.

- .7 Protect materials from freezing. Materials suspected of having been subjected to freezing are not to be used unless the manufacturer verifies, in writing, that the material has not been damaged.
- .8 Store materials away from open flame or ignition sources.
- .9 Do not transport any materials through the building.
- .10 Follow precautionary statements on product labels for storage and handling before use and make reference to applicable Material Safety Data Sheets.
- .11 Keep insulation from contact with solvent based adhesives, plastics, paints and protect against sunlight at all times by covering with opaque polyethylene film or light coloured tarpaulins.
- .12 Do not double stack pallets of materials.
- .13 Replace incorrectly stored materials at no cost to the Owner.
- .14 Handle all materials in a careful manner ensuring that no unsightly conditions or otherwise damaged material is incorporated into the Work.
- .15 Remove only in quantities required for same day use.

## **1.9 JOB SITE CONDITIONS**

- .1 Prior to installation, inspect all surfaces to which the work of this Section is to be applied, and report in writing to the Consultant any unsatisfactory conditions that would adversely affect the work.
- .2 Commencement of work shall imply unconditional acceptance of all surfaces.
- .3 Apply sprayed foam insulation only when substrata and ambient temperatures are within limits prescribed by manufacturer.
- .4 Do not apply materials to wet, iced or frosted surfaces.
- .5 Do not proceed with application of materials immediately prior to or during inclement conditions nor if wet weather is anticipated within 24 hours after application.

## **1.10 PROTECTION**

- .1 Ventilate areas to receive insulation by introducing fresh air and exhausting air continuously during and 24 hours after application to maintain non-toxic, unpolluted, safe working conditions. Do not permit exhaust air to enter interior of building. Take care that building air intake does not draw in exhaust air.
- .2 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.
- .3 Protect workers as recommended by insulation manufacturer.

- .4 Protect adjacent surfaces and equipment from damage by overspray, fallout, and dusting of insulation materials.
- .5 Dispose of waste foam daily in location designated by Owner and decontaminate empty drums in accordance with foam manufacturer's instructions.

### **1.11 WARRANTY**

- .1 Guarantee work of this Section against all defects and deficiencies in materials and workmanship for a three (3) year period from the date of Substantial Performance of the Work.
- .2 Submit each Warranty:
  - .1 Identifying the party as warrantor/guarantor.
  - .2 Issued in both the Contractor's and Owner's names.
  - .3 Including labor and materials necessary to remove, replace, and/or repair the defective products originally provided as part of the Work and any adjacent damaged materials.
- .3 Promptly notify, respond to, and correct, at no expense to the Owner, any defects or deficiencies that are reported or become apparent within the warranty period.
- .4 Notify the Owner and Consultant, in writing, of the schedule and particulars related to the execution of any warranty work.

## **2. PRODUCTS**

### **2.1 MATERIALS**

- .1 Mineral fibre wool insulation: Mineral wool batts, sized to fit framing
  - .1 Non-combustible and water repellent insulation with a rigid upper surface, conforming to CAN/ULC-S702, Type 1, preformed without membrane, minimum density 100 kg/m<sup>3</sup>, thickness as indicated.
  - .2 Insulation fasteners: Type as recommended by insulation manufacturer.
- .2 Rigid Insulation: Non-combustible, lightweight, water repellent, rigid insulation board with rigid upper surface to ASTM C612 Type IVB. Size and thickness as indicated on detail drawings. CAVITYROCK by Roxul or approved alternate.
- .3 Thermal spacers: as per drawings
  - .1 Fibreglass thermal spacers. Depth to suit application. Refer to Section 07 48 13.
  - .2 Steel Z-girts, 18 gauge, with Galvalume AZM 150 coating.
  - .3 Screws: Corrosion resistant, type as recommended by spacer manufacturer.

- .4 Rigid insulation (perimeter, and under slab insulation): Extruded polystyrene to CAN/ULC-S701, Type 4, ship-lapped edges. Thickness as indicated on drawings.
- .5 Concrete Topped Insulated Panels:
  - .1 Insulation: Extruded Polystyrene, CAN/ULC-S701, Type: 4.
    - .1 Minimum Compressive strength: 210 kPA (30psi)
    - .2 Maximum water absorption: <0.7%.
    - .3 Minimum RSI (R) Value: 0.87 per 25mm (5 per 1") in accordance with ASTM C518.
    - .4 Thickness as indicated on drawings.
    - .5 Edges: tongue and groove.
    - .6 Flashings: top flashing and side flashing to ensure air and moisture tightness, as per manufacturer's recommendation, submit shop drawing.
    - .7 Other installation materials, and accessories, as per manufacturer recommendation.
    - .8 Follow manufacturer's guidelines for installation.
  - .2 Facing: Minimum 8mm (5/16") thick glass-fibre-mesh-reinforced concrete panels.
    - .1 Minimum Compressive strength: 17.93 kPA (2600 psi)
    - .2 Maximum Flexural Strength: 10.34kPA (1500 psi)
    - .3 Acceptable products:
      - .4 "WallGuard" by T-Clear Corporation, or "TechCrete Concrete Faced Insulated (CFI) Wall Panels" by Tech-Crete Processors Ltd., or approved alternate.
  - .6 Adhesive: type recommended by insulation manufacturer.

### **3. EXECUTION**

#### **3.1 PREPARATION**

- .1 Ensure that surfaces to which insulation is to be applied are dry, clean, reasonably straight and free of grease, oil and other deleterious substances.
- .2 Examine substrates and immediately inform Consultant in writing of defects that interfere with the proper execution of the Work or represent a potentially hazardous condition.
- .3 Prepare and clean substrate surfaces to ensure proper bonding of sprayed foam insulation.
- .4 Where required, prime surfaces for adhesion of sprayed foam insulation. Apply primer in accordance with manufacturer's printed instructions.
- .5 Prior to commencement of work ensure substrates are firm, straight, smooth, dry, free of

water, snow, ice or frost, and clean of dust and debris.

### **3.2 SPECIAL PROTECTION**

- .1 Provide ventilation in interior areas to receive sprayed foam insulation, introducing fresh air and exhausting air continuously during and for 24 hours after application to maintain non-toxic unpolluted, safe working conditions. Do not permit exhaust air to enter interior of building. Take care that building air intake does not draw in exhaust air.
- .2 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.
- .3 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of sprayed foam insulation materials.
- .4 Protect workers as recommended by sprayed foam insulation manufacturer.
- .5 Dispose of waste foam daily in location designated by Consultant and decontaminate empty drums in accordance with foam manufacturer's instructions.

### **3.3 INSTALLATION**

- .1 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .2 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.
- .3 Cut and trim thermal insulation neatly to fit spaces without compression. Butt joints tightly, offset vertical joints. Use largest possible dimensions to reduce number of joints. Small pieces of insulation will not be permitted where a large single piece can be used. Where such small pieces are installed, remove and replace them at no extra cost to Owner.
- .4 Do not enclose insulation until it has been inspected and approved by Consultant.
- .5 Examine substrates and immediately inform Consultant in writing of defects that interfere with the proper execution of the Work or represent a potentially hazardous condition.
- .6 Prior to commencement of work ensure: Substrates are firm, straight, smooth, dry, free of water, snow, ice or frost, and clean of dust and debris.
- .7 Unless otherwise specified, install materials in strict accordance with manufacturer's written instructions.
- .8 Thermal spacer and mineral fibre wool insulation:
  - .1 Install thermal spacers and mineral fibre cavity wall insulation in accordance with manufacturer's written instructions with manufacturer recommended fasteners.
  - .2 Provide finish work level, plumb and true and to achieve desired thermal rating.



- .9 Concrete Topped Insulated Panels Perimeter insulation:
  - .1 Apply insulation to exterior face of foundation wall as indicated on drawings.
  - .2 Extend boards from finish grade down to minimum 600 mm below finish grade.
- .10 Under slab insulation: Install insulation boards in locations shown in accordance with manufacturer's instructions, with joints butted tight.
- .11 Between framing thermal insulation:
  - .1 Apply batt insulation between framing members to friction fit.
  - .2 Fit batt insulation tight to projections through insulation.

### **3.4 APPLICATION OF SPRAYED FOAM INSULATION**

- .1 Apply spray applied insulation to clean surfaces in accordance with manufacturer's printed instructions. Remove any loose debris, dirt, dust or other deleterious material from surfaces.
- .2 Apply primer in accordance to manufacturer's printed instructions.
- .3 Apply insulation when atmospheric and cavity temperatures are determined to be in accordance with manufacturer's requirements.
- .4 Apply foam-in-place polyurethane foam to locations specified herein and as indicated on drawings.
- .5 Apply foam-in-place insulation continuously filling the full depth of the joint around perimeter of all window and door openings to provide continuity of thermal insulation. Foam insulation may bond to substrate surfaces.
- .6 Do not enclose insulation until it has been inspected and approved by Consultant.
- .7 Remove and replace any foam insulation that is judged by the Consultant to be inadequately applied.
- .8 Overspray or excess application of foam-in-place polyurethane insulation to be removed by knife.

### **3.5 CLEAN UP**

- .1 At the completion of the Work each day remove and properly store all debris, garbage, and excess materials. Regularly and frequently dispose of such material in an approved manner.
- .2 Upon completion of the Work, clean up all debris, excess materials, and equipment and remove from the site.
- .3 Cleaning should be in accordance with the requirements detailed in Section 01 74 00, Cleaning and Waste Management.
- .4 Where required, wash adjacent surfaces to remove dust, droppings, smears, and stains

caused by Work of this Section.

- .5 Cleaning of tools and equipment to be performed in a manner not causing any damage and in a location acceptable to the Owner.
- .6 Upon completion of the Work of this Section, leave areas affected in a condition as close to, or better than, original and as acceptable to Owner.

**END OF SECTION**

## **1. GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

1. All work of this Section to conform to the appropriate requirements of the most recent edition of the Ontario Building Code.
2. Coordinate work of this Section, and with other related Sections, to ensure satisfactory and expeditious completion of the Work.
3. Review and update all work schedules with Consultant on a regular basis.
4. Examine the Work of this, and all related, Sections to confirm the extent, location, quality, and condition prior to commencing.
5. Discontinue work during severe rain, wind, heat, cold, or other such inclement weather and monitor time lost in relation to Environment Canada daily norms. Lost time will only be considered where actual conditions exceed norms.

### **1.2 RELATED SECTIONS**

- .1 Section 02 06 00: Selective Demolition
- .2 Section 04 20 00: Unit Masonry
- .3 Section 05 41 00: Structural Steel Stud Framing System
- .4 Section 05 50 00: Metal Fabrications
- .5 Section 06 10 00: Carpentry
- .6 Section 07 20 00: Insulation
- .7 Section 07 21 19: Spray-in-place Urethane Foam Insulation
- .8 Section 07 42 00: Wall Panels
- .9 Section 07 46 19: Steel Siding
- .10 Section 07 48 13: Thermally Broken Rain Screen Attachment System
- .11 Section 07 52 00: Membrane Roofing - SBS
- .12 Section 07 62 00: Sheet Metal Flashing and Trim
- .13 Section 07 90 00: Joint Sealants.
- .14 Section 08 17 13: Entry Doors and Frames.
- .15 Section 08 42 00: Fibreglass Window
- .16 Section 09 25 00: Gypsum Wallboard

### **1.3 SUMMARY**

1. Work Included:
  - .1 Furnishing of all labour, materials, equipment and services necessary for the supply and installation of air barrier membrane around the perimeter of the window and

exterior door openings to the full extent of the drawings and as specified herein.

- .2 Following removal of existing windows and exterior doors: cleaning, preparation and priming of substrate surfaces to a condition acceptable for the installation of air barrier membrane.
- .3 Installation and sealing of the air barrier membrane, including all necessary detailing at interruptions, penetrations, and terminations.
- .4 Following installation of new windows and exterior doors, provision of insulation around perimeter of frames as specified in Section 07 21 00.
- .5 Re-installation of insulation materials adjacent to window and door openings affected by air barrier membrane installation procedures.

#### **1.4 REFERENCES**

- .1 ASTM International (ASTM):
  - .1 ASTM D412-6a (2013) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension
  - .2 ASTM D3330 / D3330M-04 (2010), Standard Test for Peel Adhesion of pressure-Sensitive Tape.
  - .3 ASTM E96 / E96M-13, Standard Test Methods for Water Vapour Transmission of Materials.
  - .4 ASTM E2178-13, Standard Test Method for Air Permeance of Building Materials.

#### **1.5 SUBMITTALS**

- .1 Product Data: Submit manufacturer's printed product literature, specifications and data sheet of air / vapour barrier in accordance with Section 01 33 00 and 01 78 00 and include:
  - .1 Product characteristics.
  - .2 Performance criteria.
  - .3 Limitations
  - .4 For adhesives, primers and sealants, indicate VOC in g/L during application and curing.
- .2 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).
- .3 Quality assurance submittals:
  - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

- .2 Laboratory Test Results: submit full set of actual test results as per paragraph 8.3 of ASTM E1745 (including all after conditioning permeance tests).
- .3 Instructions: submit manufacturer's installation instructions and comply with written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.
- .4 Upon request, submit appropriately sized samples of air barrier sheathing paper, 300 mm x 300 mm of Air/vapour barrier sheet; tapes, single and double-sided; factory fabricated corners, to Consultant for approval.
- .5 Before work commences, verify in writing that materials submitted and approved are mutually compatible and are compatible with existing materials. Support verification with manufacturer's data and/or certification.
- .6 If a material submitted and approved is not suitable for verification and/or certification, submit alternate material for verification and certification for review by Consultant and approval by Owner.

#### **1.6 SCHEDULE**

- .1 The installer shall allow for co-ordination between trades and shall strictly comply with the installation dates scheduled in this specification.

#### **1.7 QUALITY ASSURANCE**

- .1 Perform work of this Section by competent workers skilled and experienced in using the specified materials.
- .2 Execute work of this Section under the continuous supervision and direction of a competent person specializing in the type of work specified.
- .3 The work shall be inspected as required prior to, during and upon completion by a representative of the manufacturer to ensure compliance with the specifications and the manufacturer's published guidelines. The manufacturer shall provide written copies of such inspections when requested and/or deemed necessary.
- .4 The continuity and integrity of the installed air barrier sheathing paper may be evaluated by the Owner through testing procedures independent of the manufacturer.
- .5 Mock-up Panels:
  - .1 Provide substrate materials in Mock-up identical to those scheduled for use in the finished building.
  - .2 To identical substrate materials scheduled for use in finished building, provide on-site in location as directed, mock-up panels to which each combination of materials

to be used under this Section shall be installed, interlapped, reinforced and secured to demonstrate compatibility, adhesion and cohesion qualities, fastening systems of flats and general workmanship to be used throughout finished work.

- .3 Apply air barrier assembly to mock up components, including back-up wall substrates, window and door frames and sills, insulation, flashing, corner condition, junction with roof system and foundation wall, and typical penetrations and gaps, illustrating materials interfaces and seals.

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

- .1 Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- .2 Store materials in a clean, dry area in accordance with manufacturer's instructions, in such a manner so as to protect them from precipitation, ground moisture and temperature extremes, not below 1°C and not above 32°C, by use of weatherproof coverings and raised platforms. Interior storage shall be employed when and where necessary.
- .3 Comply with manufacturer's printed recommendations for handling of materials.
- .4 Pallets of materials shall not be double stacked. Stack membrane on smooth floor or wood platform to eliminate warping.
- .5 Protect materials during handling and application to prevent damage or contamination. Remove and replace damaged, wet or broken material.
- .6 Ensure membrane is stamped with manufacturer's name, product name, and membrane thickness.
- .7 Accessory materials such as sealants, mastics, tapes, adhesives, primers and surface conditioners shall be stored at temperatures appropriate for those materials. Follow precautionary statements on product labels for storage and handling before use and make reference to applicable Material Safety Data Sheets.

### **1.9 ENVIRONMENTAL CONDITIONS**

- .1 The air barrier sheathing paper, membrane, and accessory materials shall be applied at ambient temperatures satisfactory to the manufacturer and under dry conditions only. Do not apply air barrier produces during inclement weather or when such conditions are expected. Do not apply when relative humidity is greater than 90 percent or when there is a possibility of rain within 24 hours or follow manufacturer instructions.

- .2 Do not apply air barrier products when air or substrate temperatures will be above 38 °C or below 5°C during product drying time.
- .3 Allow wet substrates to dry before applying products.
- .4 Prior to installation, inspect those areas to receive the air barrier sheathing paper to ensure that they are clean, dry, sound, smooth and continuous.

#### **1.10 INSPECTION**

- .1 Air / vapour barrier installation must be inspected by Consultant before work is covered. Notify Consultant when complete installation is ready for inspection.

#### **1.11 WARRANTY**

- .1 Warrant work of this Section for period of 15 years against defects and/or deficiencies in accordance with General Conditions of the contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner. Defects include but are not limited to material remaining air and water tight.
- .2 Submit each warranty:
  - .1 identifying the party as warrantor/guarantor
  - .2 issued in both the Contractor's and Owner's names
  - .3 including labour and materials for removal, repair and/or replacement of products provided as part of the Work and adjacent damaged materials.

### **2. PRODUCTS**

#### **2.1 MANUFACTURERS**

- .1 Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules, and Specifications:
  - .1 Henry Company Canada (Henry/ Baker): [www.henry.com](http://www.henry.com)
  - .2 Carlisle SynTec Incorporated (Carlisle): [www.carlisle-syntec.com](http://www.carlisle-syntec.com)
  - .3 Dow Corning Corporation (Dow Corning): [www.dowcorning.com](http://www.dowcorning.com)
  - .4 Grace Construction Canada Inc. (Grace): [www.graceconstruction.com](http://www.graceconstruction.com)
  - .5 IKO Industries Ltd. (IKO): [www.iko.com](http://www.iko.com)
  - .6 Soprema Canada (Soprema): [www.soprema.ca](http://www.soprema.ca)
  - .7 Tremco Canada (Tremco): [www.tremcosealants.com](http://www.tremcosealants.com)
  - .8 W.R. Meadows of Canada (W.R. Meadows): [www.wrmeadows.com](http://www.wrmeadows.com)

## 2.2 DESCRIPTION

- .1 Regulatory Requirements:
  - .1 Air/vapour membrane system shall control air leakage, moisture and thermal transfer while maintaining its structural integrity in accordance with the OBC.
  - .2 Air/vapour membrane shall be continuous and compatible with interfacing materials in plane of air-tightness and sealed at interfaces to provide proper air barrier system in construction. Provide greater attention for Air/vapour barrier continuity at physical connections of material components between window frames and wall assembly while taking into consideration construction tolerance, reduction of unnecessary interfaces in system and providing proper structural support to Air/vapour barrier connections, such that wind loads, deflection and air pressure differentials do not cause connections to fail.
- .2 Performance Requirements:
  - .1 Air barrier materials shall meet requirements of CAN/ULC S741.
  - .2 Air barrier shall be in accordance with ASTM E 1186 for air leakage site detection in building envelope and air retarder systems.
  - .3 Air/ vapour membrane shall have an air permeance of less than 0.02 L/s/m<sup>2</sup> (0.06 cfm/sq ft) under a pressure differential of 75 Pa (1.56 psf).
  - .4 Air/ vapour membrane shall be able to withstand 2kPa (42 psf) air pressure from either direction, with no increase in ELA (Equivalent Leakage Air).
  - .5 When membrane forms a dual role it shall meet all requirements of air rightness control and vapour diffusion control in accordance with ASTM E283 and ASTM E96.

## 2.3 MATERIALS

- .1 Material Compatibility: of various materials specified herein, select combination of base materials, transition, bridging and reinforcing membranes, adhesives and accessories so that when cured, they are compatible and give bonding characteristics equivalent to shear strength of selected Air/vapour barrier materials used.
- .2 Air/ Vapour Barrier System Cold Applied – one or more of following types:
  - .1 Primer: Unfilled asphalt conforming to CAN/CGSB 37-GP-9MPa. Or 53% solid 2 waterbased primer meeting VOC limits of authorities of authorities having jurisdiction or as recommended by membrane manufacturer.
  - .2 Mastic: Conforming to CAN/CGSB-37.5-M89.
    - .1 Self-Adhesive Type (SAT) Cold applied, reinforced modified bitumen membrane minimum 1mm (40 mils) thick, reinforced with non-woven polyester fabric,



membrane covered with plastic film 1 side, self-adhesive on the other, cut to suit design and lap requirements, "Perm-A-Barrier" by W.R. Grace & Co.

Construction Productions Division, "Blueskin SA" by Henry Company Canada, or "CCW 705" by Carlisle SynTec or "IKO AquaBarrier AVB" by IKO Industries Ltd., or "Sopraseal Stick 1100T" by Soprema Inc., or approved alternate, primer shall be as recommended by the membrane manufacturer.

- .2 Cold Applied Pre-cut Reinforcement Membrane Tape: Self-adhesive type composite sheet membrane, 1mm (40 mils) precut widths 100mm (4") or 150mm (6") or 300mm (12") to suit design requirements.

- .1 "Perm-A-Barrier" by W.R. Grace & Co. Construction Products Division, or

- .2 "Blueskin SA" by Henry Company Canada, or

- .3 "CCW 705" by Carlisle SynTec Incorporated, or

- .4 "IKO AquaBarrier AVB" by IKO Industries Ltd., or

- .5 "Sopraseal Stick 1100T" by Soprema Inc,

- .6 or approved alternate,

- .7 Primer shall be as recommended by the membrane manufacturer.

- .3 Liquid applied type:

- .1 Primary Membrane: one component elastomeric emulsion liquid air and rain barrier membrane having the following physical properties:

- .1 Air permeability: 0.002L/s.m<sup>2</sup> @ 75 Pa,

- .2 Water vapour permeance: 2.8ng/Pa.m<sup>2</sup>.s. (0.05 perms) (ASTM E96 Method B),

- .3 Acceptable Products: "Air-Bloc 21" by Henry Company Canada or by Soprema Canada or IKO Industries Ltd, or approved alternate.

- .3 Apply flexible self-adhering membranes as transition membrane flashings.

- .4 Air Barrier Flashing: composite sheet of "peel and stick" membrane compatible with window and door frames, as recommended by manufacturer.

- .5 Transition membrane shall be Blueskin SA by Henry Company Canada, or approved alternate, a SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film. For application temperatures down to -12°C, use Blueskin SA LT, or approved alternate. Membrane shall have the following physical properties:

- .1 Thickness: 1.0 mm (40mils),

- .2 Air leakage: <0.005 L/s.m<sup>2</sup> at 75 Pa in accordance with ASTM E283-91,

- .3 Water vapour permeance: 1.6 ng/Pa.m<sup>2</sup>.s (0.03 perms) in accordance with ASTM E96,
- .4 Low temperature flexibility: -30°C in accordance with CGSB 37-GP-56M,
- .5 Elongation: 200% to ASTM D412-modified.
- .6 Joint Treatment Mesh, open weave glass fabric yarn saturated with synthetic resins shall be 990-06 Yellow Jacket manufactured by Henry Company Canada, or approved alternate.
- .7 Through-wall flashing membrane and damp-proof course (Self-Adhering) shall be Blueskin TWF manufactured by Henry Company Canada, or approved alternate, a SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film, having the following physical properties:
  - .1 Colour: yellow,
  - .2 High Temperature Stability: 100°C minimum in accordance with ASTM D5147 (resistance to flow),
  - .3 Thickness: 1.0 mm (40 mils) min.,
  - .4 Air leakage: <0.005 L/s.m<sup>2</sup> at 75 Pa in accordance with ASTM E283-91,
  - .5 Water vapour permeance: 1.6 ng/Pa.m<sup>2</sup>.s (0.09 perms) to ASTM E96,
  - .6 Low temperature flexibility: -30°C to CGSB 37-GP-56M.
- .8 Polyethylene sheet of minimum 150 um (6 mils) thickness in accordance with CAN/CGSB-51.33-M, Type 2. Supply minimum 1800mm (6') roll widths.
- .9 Joint sealing tape:
  - .1 Air resistant pressure sensitive adhesive tape, tape recommended by the vapour barrier manufacturer, 50mm wide for lap joints and perimeter seals, 25mm wide elsewhere.
  - .2 Flashing tape 3M™ All Weather Flashing Tape 8067.
  - .3 Or approved alternate.
- .10 Sheet Metal Air/ Vapour Barrier and Lap Sealant:
  - .1 Miscellaneous Metal Air Seal: Minimum 0.76mm (22ga) of Grade A, ASTM A653M, Z275 zinc coated steel.
  - .2 Miscellaneous Metal air barrier seal shall be flat, without ribs.
  - .3 Fasteners and Weld:
    - .1 Sheet metal screws shall have a minimum of coating thickness of 0.008mm (0.33mil) of zinc. Other coatings providing equal or better corrosion protection may be used.

- .4 Lap Sealant: Non-Compression Tape, preformed, 100% solids, cross linked butyl rubber, polyisobutylene, hardness 65 Durometer, unaffected by UV, "Tremco 440 Tape" by Tremco Canada, or approved alternate. Tape shall be sufficiently wide and thick as to completely cover bite area.
- .11 Accessories:
  - .1 Crack Fillers: Substrate manufacturer's recommend crack fillers or sealants compatible with air barrier assembly components and adjacent materials.
  - .2 Primer: Air barrier coating manufacturer's recommended, factory-formulated, alkali-resistant primer compatible with substrate and adjacent materials.
  - .3 Adhesive: As recommended by the sheet manufacturer(s).
  - .4 Mental Flats: Minimum 1.5mm (16ga) thick X 9mm (3/8") wide strips of 100% solids polyisobutylene with paper release equivalent to "440 Tape" by Tremco Canada Ltd., or "PTI 303" by Protective Treatments Inc., or approved alternate.
- .12 Sealants: As recommended by manufacturer.

## **2.4 ACCESSORIES**

- .1 Provide all accessories as recommended by membrane manufacturer including but not limited to sealants, tapes and primers.
- .2 Types as recommended by membrane manufacturer to suit intended application.

## **3. EXECUTION**

### **3.1 EXAMINATION**

- .1 Examine surface to receive membranes to assure they are smooth, dry, and free from conditions that will adversely affect execution, permanence, or quality of work.
- .2 Examine surfaces to receive membrane. Notify Consultant if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected. Prepare surfaces in accordance with manufacturer's instructions.
- .3 Do not install Air/vapour barrier until other work which penetrates membranes has been completed.
- .4 Ensure that surfaces to receive air barrier sheathing paper are continuous, free of voids, reasonably smooth, and without excessive gaps. Blocking shall be complete and laid up tight to all framed openings.
- .5 Do not proceed with air barrier sheathing paper installation until defects are repaired.

- .6 Commencement of work is acceptance of existing conditions as being suitable for the proper performance of the air barrier.
- .7 Ensure membrane manufacturer's representative is on site at beginning of installation to provide training and supervision of Contractor's personnel in installation of Air/vapour barrier. Manufacturer's representative shall provide frequent inspection visits thereafter to assure quality and competence of membrane installation.

### **3.2 AIR SEAL MEMBRANE CONTINUITY**

- .1 Provide Air/ vapour barrier impermeable membrane seal to resist infiltration and exfiltration of air and moisture. Ensure air/ vapour membrane function as required to meet design criteria specified herein before.
- .2 Provide flexible sheet membrane at all junctions with dissimilar materials and corners as indicated and required. Apply in addition to fluid adhesive, 1.5mm X 19mm (1 1/16" X 3/4") flats of either extruded aluminum or galvanized sheet steel where attaching air seal membrane to metal frames and similar components.

### **3.3 PREPARATION OF SURFACES**

- .1 Acceptable surfaces include cast-in-place concrete, masonry (with joints struck flush), gypsum board, plywood, wafer board, wood blocking, polyethylene sheeting and window frames.
- .2 All surfaces to receive air barrier sheathing paper must be smooth, clean, dry and in good condition. All moisture, grease, machine oil or other foreign materials shall be removed.
- .3 Concrete must be smooth, monolithic, free from voids, spalled areas, loose aggregates or sharp protrusions.
- .4 Remove all nails and sharp protrusions from wood substrate materials.
- .5 All gaps or joints wider than 12mm shall be reinforced with a 100mm piece of air seal tape prior to application of Air/vapour seal membrane.

### **3.4 INSTALLATION**

- .1 Apply Air/ vapour barrier envelope to this project with utmost care to ensure positive support and continuity.
- .2 Apply Air/vapour barrier membrane to intended substrate to maintain continuity of Air/vapour barrier in longest possible lengths, and in accordance with manufacturer's written instructions and details.

- .3 Protect surrounding surfaces against damage from this work.
- .4 The air barrier membrane shall be pressed firmly into place by means of a hand roller, where possible, to ensure continuous and intimate contact with the substrate.
- .5 Ensure that air barrier membrane is free of wrinkles, folds, tears, and other such defects.
- .6 Install air barrier membrane with minimum side and end overlaps of 50mm.
- .7 Continuously clamp both edges of the air barrier membrane with a clamping bar and sealant to the window frames and to the substrate materials as indicated in the drawings. Mechanically fasten to substrate with screw fasteners at 200mm O/C., to resist high pressures of air. Fastening requirements will vary depending on the existing as-built wall conditions.
- .8 Fold starting edge back over itself to crease the paper release liner. Peel back liner to expose, starting 50-75 mm adhesive strip.
- .9 Cut and fit Air/vapour barrier as required for passage of protrusions, ensuring continuous adherence to substrate.
- .10 Apply air barrier membrane around perimeter of window and door openings, as indicated and directed, to prevent air leakage through exterior walls at window and door openings.
- .11 Work from lower levels to higher levels such that upper air barrier membrane overlaps lower membrane at areas where maximum sheet dimension is exceeded.
- .12 Seal all terminations and complete details.
- .13 Ensure services are installed and inspected prior to installation of vapour barrier.
- .14 Install in accordance with manufacturer's instructions and ASTM E1643.
- .15 Unroll vapour barrier over the entire area where the slab is to be poured. Unroll vapour barrier with the longest dimension parallel with the direction of the pour. Completely cover concrete placement area.
- .16 Lap vapour barrier over footings and seal to foundation walls.
- .17 Overlap all joints 150 mm and seal with manufacturer's tape.
- .18 Seal all penetrations (including but not limited to pipes, ducting, rebar) with manufacturer's pipe boot, or tape and mastic.
- .19 No penetration of the vapour barrier is allowed except for reinforcing steel and permanent utilities.
- .20 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed. Repair damaged areas by cutting patches of vapour barrier, overlapping

damaged area 150mm. Clean all adhesion areas of dust, dirt and moisture. Tape all four sides with tape.

- .21 Do not proceed until repair work has been inspected and approved by Consultant.
- .22 Provide Air/ vapour barrier impermeable membrane seal to resist infiltration and exfiltration of air and moisture. Unsure Air/ vapour membrane function as required to meet design criteria specified herein before.
- .23 Provide flexible sheet membrane at all junctions with dissimilar materials and corners as indicated and required. Apply in addition to fluid adhesive, 1.5mm X 19mm (1 1/15" X 3/4") flats or either extruded aluminum or galvanized sheet steel where attaching air seal membrane to metal frames and similar components.
- .24 Self-Adhesive Type:
  - .1 Begin installation after mechanical insulation clips have been applied to substrate, have cured and are examined for bond.
  - .2 Priming:
    - .1 Apply fluid primer to concrete and masonry, and all other surfaces and allow to dry 1 hour or until tack-free. Prime only areas to be covered by membrane within manufacturers' recommended time period. Reprime surfaces not covered within that time.
    - .2 Apply primers at a rate of 6-8m<sup>2</sup>/L (300-400 sq ft/gal) for type Self-Adhesive Type membrane.
    - .3 Form fillets at inside corners of walls/ slabs with liquid membrane.
  - .3 Flashing, Corner Reinforcing and Transition Membrane:
    - .1 Install membrane flashing in 900mm (36") widths. Where applicable, bring flashing a minimum of 150mm (6") onto horizontal surfaces and a minimum of 200mm (8") up walls from horizontal elevation shown.
    - .2 Self-Adhesive Type membrane will be acceptable materials for transition conditions at frames and like.
    - .3 Stagger all flashing and membrane seams.
    - .4 Install flashing to all protrusions, expansion joints, control joints and like. Bring flashing a minimum of 150mm (6") onto membrane.
    - .5 Apply mastic with inorganic mesh to all flashing seams.
  - .4 Installation:
    - .1 Install membrane in accordance with manufacturer's printed instructions over flashings and corner reinforcement.

- .2 Lay membrane without buckles, fishmouths and avoid stretching membrane.  
Where membrane cannot extend at least 100mm (4") onto horizontal surface, terminate in a horizontal reglet and seal.
- .3 Lap all membranes with 75mm (3") wide hand roller.
- .5 Inspection: inspect membrane for punctures, misaligned seams and fishmouths, apply layer of membrane over affected area, extending minimum of 150mm (6") beyond damaged area in all directions.
- .25 Vapour Barrier (Primer):
  - .1 Clean laitance, loose aggregates, oil, grease, wax, mastic compounds and from release agents from all surfaces to receive vapour barrier free from.
  - .2 Install all joint reinforcement and transition membranes in accordance with requirements specified herein, bridging all cracks greater than 3mm (1/8") wide, all bends up to 120 and transitions to framing members and similar items penetrating vapour membrane.
  - .3 Apply primers as required to substrate in accordance with manufacturer's instructions.
  - .4 Install 2 component materials to minimum dry film thickness of 1.5mm (60mils) using trowel method and 1 part material to minimum of 3mm (1/8") dry film thickness. Spray method of application will be considered on this project only after it can be demonstrated that minimum thickness can be achieved with control, uniformity and without sagging of material.
  - .5 Begin installation after mechanical insulation clips have been applied to substrate, have cured and are examined and tested for bond.
  - .6 Fill insulation joints with vapour barrier membrane. Seal voids or cracks around all components, protruding anchors and like with vapour membrane.
  - .7 Immediately after application of vapour barrier membrane, embed insulation into still fluid and unskinned membrane. Ensure insulation is firmly adhered to vapour membrane.
- .26 Air Vapour Barrier Integrity:
  - .1 Seal all 6mm joints or less between panels of gypsum sheathing with joint treatment sealant over the face of the panel joint.
    - .1 Apply sealant along the butt joint and trowel smooth to form a continuous layer over the joint extending 13mm on both sides to a uniform thickness of 3mm thick.

- .2 Seal gaps and voids or irregular joints greater than 6mm between panels of gypsum sheathing with a strip of self-adhered air/ vapour barrier transition membrane lapped a minimum of 38mm on both sides of the joint.
  - .1 Prime surfaces in accordance with manufacturers' instructions and allow to dry.
  - .2 Align and position self-adhering air/ vapour barrier transition membrane, remove protective film and press firmly into place. Ensure a minimum of 50mm overlap at all end and side laps of membrane.
  - .3 Roll all laps and membrane with a countertop roller to ensure seal.
- .3 Inside and Outside Corners
  - .1 Seal inside and outside corners of sheathing boards with a strip of self-adhering air/ vapour barrier transition membrane extending a minimum of 75mm on either side of the corner detail.
    - .1 Prime surfaces as per manufacturers' instructions and allow to dry.
    - .2 Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure a minimum 50mm overlap at all end and side laps of membrane.
    - .3 Roll all laps and membrane with a countertop roller to ensure seal.
- .4 Crack Treatment – Masonry and Concrete
  - .1 Seal cracks over 1.5mm in masonry and concrete with a strip of self-adhering air/ vapour barrier transition membrane lapped a minimum of 38m on both sides of the crack.
    - .1 Prime surfaces as per manufactures' instructions and allow to dry.
    - .2 Align and position self-adhering air/ vapour barrier transition membrane, remove protective film and press firmly into place. Ensure a minimum of 50mm (2") overlap at all end and side laps of membrane.
    - .3 Roll all laps and membrane with a counter top roller to ensure seal.
- .5 Transition Areas
  - .1 Tie-in to structural beams, columns, floor slabs and intermittent floors, parapet, curbs, foundation walls, roofing systems and at the interface of dissimilar materials as indicated on the Drawings with self-adhered air/ vapour barrier transition membrane.
    - .1 Prime surfaces as per manufactures' instructions and allow to dry.
    - .2 Align and position self-adhering air/ vapour barrier transition membrane, remove protective film and press firmly into place. Provide a minimum of 75mm lap to all substrates



- .3 Ensure a minimum of 50mm (2") overlap at all end and side laps of membrane.
- .4 Roll all laps and membrane with a counter top roller to ensure seal.
- .6 Windows and Rough Openings
  - .1 Wrap rough openings with self-adhered membrane as detailed on the Drawings.
    - .1 Prime surfaces as per manufactures' instructions and allow to dry.
    - .2 Align and position self-adhering air/ vapour barrier transition membrane, remove protective film and press firmly into place. Provide a minimum of 50mm (2") overlap at all end and side laps of membrane
    - .3 Roll all laps and membrane with a counter top roller to ensure seal.
- .27 Sheet Metal Air/ Vapour Barrier:
  - .1 Ensure surfaces receiving sealant or tape are dry firm, straight and free of loose materials, projections, ice, frost, slick grease or oil or other detrimental materials.
  - .2 Overlap metal panels 50mm (2") and secure with self-taping screws at 150mm (6") O/C along edges of panels and 300mm (12") to 150mm (6") O/C at intermediate fixings.
  - .3 At overlapping sheet metal edges, apply continuous strip of tape and gun apply continuous bead of sealant along sheet metal edges to maintain air/ vapour barrier integrity. Use flexible washers with fasteners and apply sealant at all penetrating fasteners.
  - .4 Apply flexible membrane at joints between sheet metal air vapour barrier and adjacent building components, at control joints and at cracks to maintain air/ vapour barrier integrity while accommodating expansion and contraction of system.
  - .5 Apply butyl sealant between splice joints of metal air barrier.
- .28 Flexible Membrane, Reinforcement and Accessories:
  - .1 Unless otherwise noted, it is responsible of this Section to provide and maintain continuity of air seal to adjacent dissimilar materials. Fit flexible seals at locations required to provide ait/ vapour/ water resistant and weathertight junctions. Ensure continuity of seal at end joints between lengths of material by overlapping and cementing. Seal junctions of system components to themselves and other work with sealant to maintain effective vapour, air, and water barrier and fix in place with metal flat to air seal line at adjacent material.
  - .2 Air seal membrane termination shall consist of a compatible flexible membrane reinforcement sheet embedded in a permanent, compatible sealant or fluid type air/ vapour barrier material, lapping a minimum of 200mm (8") on to base materials, and

having free edge installed to penetrating framing by combination of adhesive or fluid coating, and finally secured mechanically using continuous metal flats and screws or other mechanical fasteners spaced at 150mm (6") O/C. flats shall be installed prior to setting up and curing of fluid materials.

- .3 Apply foam tap between first sheet liner and back up structural support.
- .4 Where deflection of structure will cause dynamic joint movement between metal framing work and dissimilar materials, provide flexible seals of sufficient width to allow formation of bellows to take up any torsional and shear stresses.
- .5 Where Self-Adhesive Type membrane are used as base air/ vapour barrier, same material may also be used as flexible transition material.
- .6 This work shall be considered as 2-phase work, with final attachment of reinforced bridging sheet to be made at time of installation of door frames and windows by other Subcontractors.
- .7 Where air/ vapour barrier crosses junction between concrete block and concrete columns or beams, provide flexible membrane of 150mm (6") minimum width to bridge possible openings at such locations.

### **3.5 DETAILS**

- .1 Apply air seal tape and/or sealants to seal any voids caused in fitting the Air/vapour seal membrane around window and door perimeters.
- .2 Fit air barrier membrane tightly around all penetrations through it and seal using mastic and/or sealants.
- .3 Seal clamped edges of air barrier membrane using continuous bead of mastic and/or sealants.
- .4 Install air seal tape in maximum continuous length possible, and lap tape end pieces minimum of 100 mm.
- .5 Apply the air barrier membrane around the perimeter of all window and door openings, and terminate at a point that will ensure that it will not be visible from the interior or exterior.
- .6 At window and door frames terminate air barrier membrane as indicated and directed to ensure that finished siding and trim completely conceal membrane materials.
- .7 Seal side and end overlaps of air barrier membrane with air seal tape prior to re-installation of cladding and trim members.
- .8 Terminate air barrier membrane edges in a minimum 10-mm wide continuous bead of sealant and install corrosion resistant screw fasteners with plastic washers.

- .9 Space fasteners at a maximum spacing of 200 mm along all joints and edges.
- .10 Use plastic washers at all fastener locations that do not coincide with furring strips (if applicable).
- .11 Reinforce corners of window and door openings and mechanical penetrations with air seal tape or air barrier membrane to Consultant's approval.
- .12 Incorporate manufacturer's installation recommendations and details into the Work, and immediately notify Consultant of any variation between specified requirements and manufacturer's recommendations.
- .13 Before covering air barrier membrane, inspect and repair as necessary any punctures, damaged areas or inadequately lapped seams. Repairs shall be made using an appropriately sized section of air seal tape or membrane sized to extend a minimum of 100 mm in all directions from the perimeter of the affected area.

### **3.6 CLEANING**

- .1 At the completion of the Work each day remove and properly store all debris, garbage, and excess materials. Regularly and frequently dispose of such material in an approved manner.
- .2 Upon completion of the Work, clean up all debris, excess materials, and equipment and remove from the site.
- .3 Cleaning should be in accordance with the requirements detailed in Section 01 74 00, Cleaning and Waste Management.
- .4 Where required, wash adjacent surfaces to remove dust, droppings, smears, and stains caused by Work of this Section.
- .5 Cleaning of tools and equipment to be performed in a manner not causing any damage and in a location acceptable to the Owner.
- .6 Upon completion of the Work of this Section, leave areas affected in a condition as close to, or better than, original and as acceptable to Owner.
- .7 All drippage, or spills of sealants or primers shall be cleaned to approval of Consultant.

**END OF SECTION**

## **1. GENERAL**

### **1.1 SECTION INCLUDES**

- .1 Design, labour, Products, equipment and services necessary for Exterior Solid Phenolic Cladding Panel Work in accordance with the Contract Documents. Design is based on Trespa Meteon, minimum 10mm thickness, for exterior application, hidden fastener system, or approved alternate.
- .2 Exterior solid phenolic cladding panel system and accessories as required for a complete drained and back-ventilated rainscreen system.
  - .1 Wall panels.
  - .2 Fascia.
  - .3 Soffits.
  - .4 Canopies
  - .5 Columns
  - .6 Railings and fences
  - .7 Non-facade accents
  - .8 Exterior garbage screen

### **1.2 RELATED SECTIONS**

- .1 Section 05 41 00: Structural Steel Stud Framing System
- .2 Section 05 50 00: Metal Fabrications
- .3 Section 06 10 00: Carpentry
- .4 Section 07 20 00: Insulation
- .5 Section 07 21 19: Spray-in-place Urethane Foam Insulation
- .6 Section 07 27 00: Air / Vapour Barrier
- .7 Section 07 46 19: Steel Siding
- .8 Section 07 48 13: Thermally Broken Rain Screen Attachment System
- .9 Section 07 52 00: Membrane Roofing - SBS
- .10 Section 07 62 00: Sheet Metal Flashing and Trim
- .11 Section 07 90 00: Joint Sealants.
- .12 Section 09 25 00: Gypsum Wallboard

### **1.3 RELATED SECTIONS**

- .1 Section 07 20 00 – Insulation; exterior insulation, as required for energy performance compliance and/or required to conform to CAN ULC S134.

- .2 Section 07 21 19 – Spray-in-place Urethane Foam Insulation.
- .3 Section 07 48-13 – Thermally Broken Rain Screen Attachment System.
- .4 Section 09 21 16 – Gypsum Board Assemblies.

#### **1.4 REFERENCES**

- .1 ASTM International (ASTM):
  - .1 ASTM B 117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.
  - .2 ASTM D 635 – Standard Test Method for Small Scale Burning.
  - .3 ASTM D 1929 – Standard Test Method for Ignition Temperature.
  - .4 ASTM D 2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
  - .5 ASTM D 2247 - Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.
  - .6 ASTM E 84- Surface Burning Characteristics of Building Materials and Assemblies.
  - .7 ASTM E 119 – Standard Test Method for Fire Rated or Fire Resistive Construction.
  - .8 ASTM E 330 – Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors Under the Influence of Wind Loads.
- .2 International Organization for Standardization (ISO):
  - .1 ISO 105 A02-93 - Tests for Color Fastness -- Part A02: Grey scale for assessing change in color.
  - .2 ISO 178 – Determination of Flexural Properties.
  - .3 ISO 527-3 – Determination of Tensile Properties.
  - .4 ISO 846 – Evaluation of the Action of Organisms.
- .3 National Fire Protection Association (NFPA):
  - .1 NFPA 268 – Standard Test Method for Determining Ignitibility of Exterior Wall Assemblies Using a Radiant Heat Energy Source.
  - .2 NFPA 285 – Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components
  - .3 CAN ULC S134 – Standard Method of Fire Test of Exterior Wall Assemblies
  - .4 ASTM E-84 Standard test method for surface burning characteristics of building materials

## **1.5 SUBMITTALS**

- .1 Submit under provisions of Section 01 30 00.
- .2 Submit documentation proofing product durability in the GTA area.
- .3 Product Data: Manufacturer's data sheets on each product to be used, including:
  - .1 Preparation instructions and recommendations.
  - .2 Storage and handling requirements and recommendations.
  - .3 Installation methods.
- .4 Shop Drawings: Submit plan, section, elevation and perspective drawings necessary to describe and convey the layout, profiles and product components, including edge conditions, panel joints, fixture location, anchorage, accessories, finish colors, patterns and textures.
- .5 Code Compliance: Documents showing product compliance with local building code shall be submitted prior to the bid. These documents shall include, but not be limited to, appropriate Evaluation Reports and/or test reports supporting the use of the product. Alternate materials must be approved by the architect of record prior to the bid date.
- .6 Engineering Calculations: Submit engineering calculations as required by the local building code, showing that the installed panels and attachments system meets the wind load requirements for the project.
- .7 Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- .8 Verification Samples: For each finish product specified, two samples a minimum of 3.5 inches by 3.5 inches (89 mm by 89 mm) representing actual product, color, and patterns.
- .9 Operation and Maintenance Data: Submit operation, maintenance, and cleaning information for products covered under this section.

## **1.6 QUALITY ASSURANCE**

- .1 Retain a Professional Engineer, licensed in Province of Ontario, with experience in Work of comparable complexity and scope, to perform following services as part of Work of this Section:
  - .1 Design of Wall Panels System.
  - .2 Review, stamp, and sign shop drawings and design calculations.
  - .3 Conduct shop and on-site inspections, prepare and submit written inspection reports verifying that this part of Work is in accordance with Contract Documents and reviewed shop drawings.

- .2 Manufacturer Qualifications: All primary panel products specified in this section will be supplied by a single manufacturer with a minimum of ten years' experience.
  - .1 Products covered under the Work listed in this section are to be manufactured in an ISO 9001 certified facility.
- .3 Installer Qualifications: All products listed in this section are to be installed by a single installer trained and approved by the manufacture or representative.
- .4 Manufacturer's Field Services: Upon Owner's request, provide manufacturer's field service consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
- .5 Mock-ups: Provide Mock-ups in locations designated by Consultant and as required to demonstrate quality of workmanship. Maintain Mock-ups during construction in an undisturbed condition as a standard for judging the completed work.
  - .1 Fabricate, deliver, and erect one full scale 1200 mm wide x 1800 mm high mock-up metal siding construction, in location acceptable to Consultant.
  - .2 Demonstrate finish, colours, typical connections of the project, and quality of workmanship.
  - .3 Approved mock-ups may form part of finished work if left undisturbed at time of Substantial Performance of the work. Remove and dispose of mock-ups which do not form part of Work.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- .1 Delivery:
  - .1 During transportation, use stable, flat pallets that are at least the same dimension as the sheets.
  - .2 Materials shall be packaged to minimize or eliminate the possibility of damage during shipping. Items such as wooden side boards, wooden lid, and spacers or protective sheeting between panels shall be used to protect the panels from surface and/or edge damage.
- .2 Storage:
  - .1 Store products in an enclosed area protected from direct sunlight, moisture and heat. Maintain a consistent temperature and humidity.
  - .2 Store products in manufacturer's unopened packaging until ready for installation.
  - .3 Stack panels using protective dividers to avoid damage to decorative surface.

- .4 For horizontal storage, store sheets on pallets of equal or greater size as the sheets with a protective layer between the pallet and sheet and on top of the uppermost sheet.
- .5 Do not store sheets, or fabricated panels vertically.
- .3 Handling:
  - .1 Remove protective film within 24 hours of the panels being removed from the pallet.
  - .2 When moving sheets, lift evenly to avoid dragging panels across each other and scratching the decorative surface.
  - .3 Remove all labels and stickers immediately after installation.

### **1.8 PROJECT CONDITIONS**

- .1 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- .2 Field Measurements: Verify actual measurements/openings by field measurements performed by the installer prior to release for fabrication. Recorded measurements to be indicated on shop drawings based on field measurements provided by the installer. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

### **1.9 WARRANTY**

- .1 Warranty: At project closeout, provide manufacturer's minimum 5 year warranty covering defects in materials.
- .2 Submit each warranty:
  - .1 Identifying the party as warrantor/guarantor.
  - .2 Issued in both the Contractor's and Owner's names.
  - .3 Including labour and materials necessary for removal, repair and/or replacement of defective products or originally provided as part of the Work and adjacent damages resulting from the defect.
- .3 The Warranty shall cover the replacement or repair of the wall panels and associated work as the result of faulty materials and/or workmanship.
- .4 Promptly notify, respond to, and correct, at no expense to the Owner, any defects or deficiencies that are reported or become apparent within the Warranty period.
- .5 Notify the Owner and Consultant, in writing, of the schedule and particulars related to the



execution of the warranty work.

## 2. PRODUCTS

### 2.1 MANUFACTURERS

- .1 Acceptable Manufacturer: Trespa International B.V.; P.O. Box 110, 6000 AC Weert Wetering 20, 6002 SM Weert The Netherlands; [www.trespa.com](http://www.trespa.com), or approved alternate.
- .2 Distributor/Representative:  
Allied Technical Solutions  
Attn: Nicolas Vanegas [nicolas@atsspec.com](mailto:nicolas@atsspec.com)  
885 Milner Avenue, Toronto, Ontario M1B 5V8  
Tel: 1-800-245-1880 | Cell: (416) 807-4279 | Fax: (416) 250-5656

### 2.2 WALL PANELS

- .1 Solid Phenolic Wall Panels:
  - .1 Material: Solid panel manufactured using a combination of high pressure and temperature to create a flat panel created from thermosetting resins, homogenously reinforced with wood-based fibers and an integrated decorative surface or printed décor.
  - .2 Color: As selected by the Architect from manufacturer's standard color palette. Provide full range of sample for Consultant's review.
  - .3 Finish: Satin sheen.
  - .4 Panel Core: Fire retardant (FR) black core.
  - .5 Panel Thickness: 3/8 inch (10 mm), as indicated on the Drawings.
  - .6 Physical Properties:
    - .1 Modulus of Elasticity: 1,300,000 psi (9000 N/mm<sup>2</sup>) minimum, ISO 178.
    - .2 Tensile Strength: 10,100 psi (70 N/mm<sup>2</sup>) minimum, ISO 527-2.
    - .3 Flexural Strength: 14,500psi (120 N/mm<sup>2</sup>) minimum, ISO 178.
    - .4 Thermal Conductivity: 2.1 BTU/inch/ft<sup>2</sup>.hr.°F, EN 12524.
    - .5 Structural Performance (ASTM E330):
      - .1 Panels shall be designed to withstand the Design Wind Load based upon the local building code, but in no case less than 15 pounds per square foot (psf). Wind load testing shall be done in accordance with this standard to obtain the following results:

- .2 Normal to the plane of the wall, the maximum panel deflection shall not exceed L/175
- .3 Normal to the plane of the wall between supports, deflection of the aluminum sub-framing members shall not exceed L/175 or 3/4 inch, whichever is less
  - .1 At 1-1/2 times design pressure, permanent deflection of framing members shall not exceed L/100 of span length and components shall not experience failure or gross permanent distortion.
- .4 If system tests are not available, mock ups shall be constructed and tests performed under the direction of an independent third party laboratory which show compliance to the minimum standards listed above.
- .6 Fire Performance:
  - .1 Smoke Development: Less than 450, ASTM E84.
  - .2 Ignition Temperature: Greater than 650 degree F (350 degree C) above ambient, ASTM D1929.
  - .3 Burning Classification: CC1 or CC2, ASTM D635.
  - .4 When required for compliance with local building codes, the wall cladding assembly shall show no degradation of the rating of Fire Resistant Assemblies, ASTM E119.
  - .5 When required for compliance with local building codes, the wall cladding assembly shall meet the performance requirements for Multi Story construction, CAN ULC S134 – Standard Method of Fire Test of Exterior Wall Assemblies
  - .6 When required for compliance with local building codes, the wall cladding assembly shall not ignite when exposed to a radiant heat energy source, NFPA 268.
- .7 Finish Performance Requirements: Electron Beam Cure® resin in conformance with the following general requirements:
  - .1 Color: As selected by the architect/engineer from manufacturer's standard colors or a custom color to be matched by the panel supplier.
  - .2 Humidity Resistance: No formation of blisters when subjected to condensing water fog at 100% relative humidity and 100 degree F (38 degree C) for 3000 hours, ASTM D 2247.

- .3 Salt Spray Resistance: Corrosion creepage from scribe line (1/16 inch (1.6 mm) max.) and minimum blister rating of 8 within the test specimen field, ASTM B117.
  - .4 Weather Exposure: Accelerated – 3000 hours in Atlas Type Weatherometer using cycle of 90 minutes light and 30 minutes diminished light and demineralized water with a maximum color change of 5 Delta E units from the original color according to ASTM D-2244, with the exception of Uni-Colors A12.3.7 / A18.3.5 / A04.1.7, which will not deviate more than 10 Delta E units from original color according ASTM D-2244.
  - .5 Color Stability: The decorative surface comply with, classification, 4 - 5 measured with the grey scale according to ISO 105 A02-93 according to test method EN 438-2:29.
  - .6 Microbial Characteristics: Will not support micro-organic growth (ISO 846).
- .2 Mounting System: shall be concealed fastening, unless otherwise noted on the drawing.
    - .1 TS110(-134) – Exposed fastening on fixed depth steel sub-framing, with powder coated, coloured to match panel, and tamper-resistant screws. For application at railings, garbage screens, refer to drawings.
    - .2 TS210 Concealed fastening on fixed depth aluminum sub-framing. For application at canopies refer to drawings.
    - .3 Other installation systems - Include test documentation showing compliance with the performance criteria set forth in the specification and in accordance with the local building code.
  - .3 Aluminum Sub Structure: Aluminum sub-structure designed to withstand structural loading due to wind load and the dead load of the panel, painted as required to conceal behind the open joinery of the attachment system.
    - .1 Extrusions, including corner closures, joint closures and vent screens, formed members, sheet, and plate shall conform to the recommendations of the manufacturer.
  - .4 Extruded Aluminum Trim: Color as specified in the finish schedule.
  - .5 Fasteners (Concealed/Exposed): Fasteners shall be non-corrosive and as recommended by panel manufacturer. Exposed fasteners shall be colored to match panels where required by the architect, and tamper-resistant.

## **2.3 FABRICATION**

- .1 Panels: Solid phenolic impregnated kraft paper wall panels with no voids, air spaces or foamed insulation in the core material. Accessory items in accordance with manufacturer's recommendations and approved submittals
- .2 Panel Weight: minimum 10 mm (3 lb/ ft<sup>2</sup>).
- .3 Panel Bow:  $\leq 2 \text{ mm / m}$  ( $\leq 0.079 \text{ inch/39.38 inches}$ ).
- .4 Panel Dimensions: Field fabrication shall be allowed where necessary, but shall be kept to an absolute minimum. All fabrication shall be done under controlled shop conditions when possible.
- .5 Appearance: Panel lines, breaks, and angles shall be sharp, true, and surfaces free from warp and buckle

## **3. EXECUTION**

### **3.1 EXAMINATION**

- .1 Do not begin installation until substrates have been properly prepared.
- .2 Surfaces to receive panels shall be even, smooth, dry, and free from defects detrimental to the installation of the panel system. Notify Contractor in writing of conditions detrimental to proper and timely completion of the work.
- .3 Confirm exterior sheathing is plumb and level, with no deflection greater than 1/4 inch (6 mm) in 20 feet (6096 mm).
- .4 If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding. Do not proceed with installation until unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- .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.

### **3.3 INSTALLATION**

- .1 Install solid phenolic wall panels and sub-frame system in accordance with manufacturer's instructions.
- .2 Install solid phenolic wall panel's plumb and level and accurately spaced in accordance with manufacturer's recommendations and approved submittals and drawings.

- .3 Anchor panels and sub-framing securely per engineering recommendations and in accordance with approved shop drawings to allow for necessary movement and structural support.
- .4 Fasten solid phenolic wall panels with fasteners approved for use with supporting substrate.
- .5 Do not install panels or component parts which are observed to be defective or damaged including, but not limited to: warped, bowed, abraded, scratched, and broken members.
- .6 Do not cut or trim component parts during installation in a manner that would damage the finish, decrease the strength, or result in visual imperfection or a failure in performance. Return component parts with require alteration to the shop for re-fabrication or replacement.
- .7 Install corner profiles and trim with fasteners appropriate for use with adjoining construction as indicated on the Contract Drawings and as recommended by manufacturer.

### **3.4 FIELD QUALITY CONTROL**

- .1 Independent Inspection and Testing:
  - .1 Owner may retain an independent Consultant to carry out periodic supervision during construction. If requested by Consultant, contractor to take cut-test samples of assembly, identify locations and submit to Consultant for review and testing.
  - .2 Employment of Inspection and Testing agencies does not relieve the Contractor's responsibility to perform work in accordance with the Contract Documents.
  - .3 Provide assistance required for executing Inspection and Testing by the appointed agencies and/or the Consultant.
  - .4 Allow Inspection and Testing agencies and/or the Consultant access to the work.
  - .5 If required by the Inspection and Testing agency or by the Consultant, provide cuts for testing. Repair cuts without cost to the Owner.
  - .6 Contractor shall make an allowance for minimum one cut test per day and all required patching to match existing assembly.
  - .7 Failed test results will require remedial work acceptable to Consultant and may entail complete removal and replacement of failed areas.
  - .8 Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

### **3.5 ADJUSTING AND CLEANING**

- .1 Remove masking or panel protection as soon as possible after installation. Any masking intentionally left in place after panel installation on an elevation, shall become the responsibility of the General Contractor to remove.
- .2 Adjust final panel installation so that all joints are true and even throughout the installation. Panels out of plane shall be adjusted with the surrounding panels to minimize any imperfection.
- .3 Repair panels with minor damage. Remove and replace panels damaged beyond repair as a direct result of the panel installation. After installation, panel repair and replacement shall become the responsibility of the General Contractor.
- .4 Clean finished surfaces as recommended by panel manufacturer. After installation cleaning, cleaning during construction shall become the responsibility of the General Contractor.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

1. All work of this Section to conform to the appropriate requirements of the most recent edition of the Ontario Building Code.
2. Coordinate work of this Section, and with other related Sections, to ensure satisfactory and expeditious completion of the Work.
3. Review and update all work schedules with Consultant on a regular basis.
4. Examine the Work of this, and all related, Sections to confirm the extent, location, quality, and condition prior to commencing.
5. Discontinue work during severe rain, wind, heat, cold, or other such inclement weather and monitor time lost in relation to Environment Canada daily norms. Lost time will only be considered where actual conditions exceed norms.

### **1.2 RELATED SECTIONS**

- .1 Section 02 06 00: Selective Demolition
- .2 Section 04 20 00: Unit Masonry
- .3 Section 05 41 00: Structural Steel Stud Framing System
- .4 Section 05 50 00: Metal Fabrications
- .5 Section 06 10 00: Carpentry
- .6 Section 07 20 00: Insulation
- .7 Section 07 21 19: Spray-in-place Urethane Foam Insulation
- .8 Section 07 27 00: Air / Vapour Barrier
- .9 Section 07 42 00: Wall Panels
- .10 Section 07 48 13: Thermally Broken Rain Screen Attachment System
- .11 Section 07 52 00: Membrane Roofing - SBS
- .12 Section 07 62 00: Sheet Metal Flashing and Trim
- .13 Section 07 90 00: Joint Sealants.
- .14 Section 08 17 13: Entry Doors and Frames.
- .15 Section 08 42 00: Fibreglass Window
- .16 Section 09 25 00: Gypsum Wallboard
- .17 Section 09 91 00: Painting

### **1.3 SCHEDULE**

1. The installer shall allow for co-ordination between trades interfacing with the steel siding installation and shall strictly comply with the installation schedule approved by the Owner.

#### **1.4 SUMMARY**

1. Design, labour, Products, equipment and services necessary for metal siding Work in accordance with the Contract Documents.
2. Metal siding system should be designed to withstand all expected loads.
3. Protect and repair as necessary, all materials and finishes adjacent to, or affected by the Work.
4. Install Metal Siding, including Thermally Broken Rain Screen Attachment support System and Accessories (section 07 48 13).
5. Install a continuous air/moisture barrier to the approved substrate to provide a line of air tightness as the air barrier system.
6. Install new metal flashings in accordance with the requirements of Section 07 62 00.
7. Install new caulking and sealant materials in accordance with the requirements of Section 07 90 00.
8. Work furnished and included:
  - .1 Insulation.
  - .2 Supporting sub-girts.
  - .3 Cladding profile.
  - .4 Accessories including associated flashings, closures, sealants.

#### **1.5 SUBMITTALS**

- .1 Submit shop drawings in accordance with Section 01 33 00 indicating: Dimensions, profiles, Products, wall elevations, details, arrangements of sheets and joints, thicknesses, dimensions, locations of supports and fasteners and special shapes:
  - .1 Ensure shop Drawings clearly indicate type of metal cladding being supplied, profiles of inner and outer skin, closures, surface finish, type and thickness of insulation, thicknesses of metal cladding components, size, spacing and location of structural support, thermally broken rain screen attachment, metal studs, "Z" bars, location of joints, and sub-girts, connections, air seal closures, cut, punched and drilled holes, paths of pressure equalization and cavity drainage, types and locations of fastenings. Indicate provisions for structural and thermal movement between metal cladding and adjacent materials.
  - .2 Indicate arrangement of cladding system, including dimensions, location of joints, profiles of inner and outer skin, types and locations of supports, fasteners, flashing, closures and all metal components related to the cladding installation.



- .3 Indicate panel sizes and finishes, and arrangement of all joints in elevation of reflected plan, as applicable.
- .4 Include details of installation, manufacturer's installation instructions, and complete data on supplementary structural back-up system being furnished under this Section, along with interface details.
- .5 Drawings shall be signed and sealed by a Professional Engineer, attesting to the ability of the new cladding assembly to withstand all of the specified loads as per OBC.
- .6 Design the components of the work of this Section requiring structural performance in accordance with applicable codes and regulations, review design documents, and provide site administration and inspection of this part of the work.
- .2 Before work commences, verify in writing that materials submitted and approved are mutually compatible and are compatible with existing materials. Support verification with manufacturer(s) data and/or certification.
- .3 If a material submitted and approved is not suitable for verification and/or certification, submit alternate material for verification and certification for review by Consultant and approval by Owner.
- .4 No deviations from any of the above submittals will be permitted without the written permission of the Consultant.
- .5 Submit to the Consultant the panel manufacturer's maintenance and repair procedures.
- .6 Submit copies of manufacturer's Product data in accordance with Section 01 30 00 indicating:
  - .1 Performance criteria, compliance with appropriate reference standard, characteristics, limitations.
  - .2 Product transportation, storage, handling and installation requirements.
- .7 Engineering data: submit engineering data substantiating that previously specified structural requirements of the metal cladding assembly meet minimum requirements of CSA S136.
- .8 Certificates: submit written certification that the Products, systems, and assemblies have been installed in accordance with manufacturer's requirements.
- .9 Upon request, submit copy of manufacturer's specifications, installation instructions, and Material Safety Data Sheets.

## **1.6 SAMPLES AND MOCK UP**

- .1 Submit samples of metal cladding profile and colour, 3 samples each, for review by the

- consultant, prior to fabrication. Submit samples in accordance with Section 01 30 00:
- .1 600 x 600 mm samples of siding system showing fully assembled components including face sheets, sub-girts, insulation and concealed sealant. Sample to be fabricated using exact colour and gauges specified.
  - .2 Reports: Submit written field inspection and test report results after each inspection.
  - .3 Submit metal siding assemblies in size requested of all fabricated materials forming a part of the metal cladding. Show interior and exterior corner assemblies. Show weatherproof sealed exterior and interior joints.
  - .4 Mock-ups: Provide Mock-ups in locations designated by Consultant and as required to demonstrate quality of workmanship. Maintain Mock-ups during construction in an undisturbed condition as a standard for judging the completed work.
    - .1 Fabricate, deliver, and erect one full scale 1200 mm wide x 1800 mm high mock-up metal siding construction, in location acceptable to Consultant.
    - .2 Demonstrate finish, colours, typical connections of the project, and quality of workmanship.
    - .3 Approved mock-ups may form part of finished work if left undisturbed at time of Substantial Performance of the work. Remove and dispose of mock-ups which do not form part of Work.

## **1.7 REFERENCES**

- .1 Design of cladding system in accordance to the latest edition of:
  - .1 Canadian Sheet Steel Building Institute Standards 20M.
  - .2 Ontario Building Code.
  - .3 ANSI B18.6.4, Screws, Tapping and Metallic Drive, Inch Series, Thread Forming and Cutting.
  - .4 ASTM A653/A653M, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
  - .5 ASTM C920, Specification for Elastomeric Joint Sealants.
  - .6 CAN/CGSB-1.40-M, Primer, Structural Steel, Oil Alkyd Type.
  - .7 CAN/CSA-G40.20/G40.21M, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels.
  - .8 CSA S136, Cold Formed Steel Structural Members.
  - .9 CSA S136.1, Commentary on CAN/CSA S136-M, Cold Formed Steel Structural Members.
  - .10 CAN/ULC-S702, Mineral Fibre Board Thermal Insulation.

## **1.8 DESIGN REQUIREMENTS**

- .1 Design metal siding system in accordance with CSA S136, S136.1, and to withstand live, dead, lateral, wind, seismic, handling, transportation, and erection loads.
- .2 Design metal siding system in accordance with following Climatic Design Data for Toronto contained in Ontario Building Code.
  - .1 Design Temperature: January 1%, July 2 ½%.
  - .2 Wind (Hourly Wind Pressures): 1 in 50 year occurrence. Design wall system to resist wind loads, positive and negative, expected in this geographical region OBC climatic data.
  - .3 Earthquake: Seismic Data as listed.
- .3 Design metal siding system to limit deflection under design loads, to L/240.
- .4 Design metal siding system to prevent restriction of thermal induced movement which would induce deformation such as warping, buckling, and failure of joint seals and fasteners. Design metal siding system to prevent vibration when subject to the effects of wind.
- .5 Design miscellaneous, additional structural framing members and sag rods, required to complete metal siding system, where not indicated on Contract Drawings.
- .6 Deflection of the wall system is not to exceed 1/180th of the span for the wind load based on serviceability limit states.
- .7 Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, overstressing of components, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.
- .8 Temperature Change (Range): 20°C, ambient; 40°C, material surfaces
- .9 Design expansion joints to accommodate movement in cladding and between cladding and structure to prevent permanent distortion or damage to the cladding.
- .10 Design wall system to maintain the following erection tolerances:
  - .1 Maximum variation from plane or location shown on shop drawings: 20mm/10m.
  - .2 Maximum offset from true alignment between two adjacent members abutting end to end in line: 1 mm (0.04 inches).
- .11 Design pressure-equalized and fully drained rain screen system: no water infiltration into the building envelope under design wind loads of the OBC. Design a thermally broken cladding support system as per section 07 48 13.

## **1.9 QUALITY ASSURANCE**

- .1 Retain a licensed Professional Engineer, registered in Province of Ontario, to perform following services for metal siding Work:
  - .1 Design of metal siding Work.
  - .2 Review, stamp, and sign shop drawings.
  - .3 Conduct shop and field inspections and prepare and submit inspection reports.
- .2 Pre-installation meeting: Arrange with manufacturer's representative, Contractor, and Consultant to inspect substrates, and to review installation procedures 48 hours in advance of installation.
- .3 Manufacturer of wall system, and installer shall demonstrate at least five years' experience in projects similar in scope.
- .4 Manufacturer shall take proper steps during manufacturing to produce quality product to avoid oil canning in their cladding profile specified herein. Take measures as recommend by CSSBI Sheet Steel Facts 13.
- .5 Qualifications of Welders: welding of structural components related to work of this Section shall be performed by fabricator having min. certification of Division 3 of CSA W47.1. Conform to Technical Bulletins and Metric Standards of CSSBI.
- .6 Single Source Responsibility: ensure primary materials provided in this Section are obtained from one source nu a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.
- .7 This section establishes the standard of quality required for the complete metal wall system. Proposed substitutions must meet this standard to be considered:
  - .1 The request includes a complete item-by-item description comparing the proposed substitution to the specified system, together with manufacturer's literature, samples, test data, engineering standards and performance evaluation indicating comparable standards to those specified.

## **1.10 MAINTENANCE DATA**

- .1 Provide maintenance data for cleaning and maintenance of siding finishes for incorporation into manual specified in Section 01 77 00.

## **1.11 PRODUCT DELIVERY, HANDLING AND STORAGE**

- .1 Store components and materials in accordance with metal siding manufacturer's recommendations and protect from elements.
- .2 Protect prefinished steel during fabrication, transportation, site storage and erection, in

accordance with CSSBI Standards.

### **1.12 JOB SITE CONDITIONS**

- .1 Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings where metal sidings are indicated to fit walls and other construction.
- .2 Establish dimensions and proceed with fabricating metal sidings where field measurements cannot be made without delaying the work; allow for site trimming and fitting.
- .3 Install materials outlined in this Section after completion of work by other Sections is complete, and all penetrations are watertight; to provide adequate dry, clean, level, and plumb surfaces for installation and adhesion.
- .4 Examine surfaces in which cladding is to be attached and check environmental conditions and do not commence work until surfaces and conditions are satisfactory.
- .5 Protect adjacent areas and materials from damage, drops, and spills during installation.

### **1.13 GUARANTEE**

- .1 For work in this section, warranty by installer against defects or deficiencies in materials or workmanship shall be for a period of one year from date of substantial completion.

### **1.14 WARRANTY**

- .1 Provide a manufacturer's written warranty: Furnish metal siding manufacturer's written warranty covering failure of factory-applied exterior finish within the warranty period. Warranty period for finish: min. 20 years after the date of Substantial Completion. The values below are based on normal environments and exclude any aggressive atmospheric conditions.
  - .1 Barrier Series (Polyvinyl Chloride – PVC) will not change colour more than ten (10.0) Hunter  $\Delta E$  units as determined by ASTM method D-2244-02 at any time for twenty (20) years from date of installation (20.5 yrs from application).
  - .2 10000 Series (Polyvinylidene Flouride - PVDF) will not visibly (within 10 metres to the unaided naked eye) crack, chip, or peel (lose adhesion) for thirty-five (35) years from date of application. This does not include minute fracturing that may occur during the normal fabrication process. 10000 Series (Polyvinylidene Flouride - PVDF) will not chalk in excess of a number eight (8) rating, in accordance with ASTM D-4214-98 method D659 at any time for thirty-five (35) years from date of

- installation (35.5 yrs from application); will not change colour more than five (5.0) Hunter  $\Delta E$  units as determined by ASTM method D-2244-02.
- .3 WeatherXL™ (Siliconized Polyester - SMP) will not crack, chip, or peel (lose adhesion) for forty (40) years from date of installation (40.5 yrs from application). This does not include minute fracturing that may occur during the normal fabrication process. WeatherXL™ (Siliconized Polyester - SMP) will not chalk in excess of a number six (6) rating, in accordance with ASTM D-4214-98 method D659 at any time for thirty (30) years from date of installation (30.5 yrs from application); will not change colour more than eight (8.0) Hunter  $\Delta E$  units as determined by ASTM method D-2244-02.
- .2 Maintain the mechanical qualities, water tightness and frost resistance, providing the panels are correctly installed on a ventilated construction in accordance to the installation procedures outlined in this Section.
- .3 Submit each warranty:
- .1 Identifying the party as warrantor/guarantor.
- .2 Issued in both the Contractor's and Owner's names.
- .3 Including labour and materials necessary for removal, repair and/or replacement of defective products or originally provided as part of the Work and adjacent damages resulting from the defect.
- .4 The Warranty shall cover the replacement or repair of the metal sidings and associated work as the result of faulty materials and/or workmanship.
- .5 Promptly notify, respond to, and correct, at no expense to the Owner, any defects or deficiencies that are reported or become apparent within the Warranty period.
- .6 Notify the Owner and Consultant, in writing, of the schedule and particulars related to the execution of the warranty work.

## **2. PRODUCTS**

### **2.1 MATERIALS**

- .1 Products of following manufacturers are acceptable subject to conformance to requirements of drawings, schedules, and specifications:
- .1 Agway Metals Inc.: [www.agwaymetals.com](http://www.agwaymetals.com)
- .2 Roll Form Group: [www.rollformgroup.com](http://www.rollformgroup.com)
- .3 Vicwest: [www.vicwest.com](http://www.vicwest.com)
- .4 Or approved alternate.
- .2 Metal Wall System:

- .5 Steel Liner:
  - .1 Vicwest L800 Liner, or approved alternate.
  - .2 Fabricated from ASTM A653M structural quality Grade 230 galvanized steel, with zinc coating of Z275 galvanized, as designated by ASTM A653M having a nominal core thickness minimum 1.00mm (20ga - 0.0200”).
- .3 Sub-girts: Minimum 1.21 mm (0.048”) thick formed galvanized steel, ASTM A653M Grade 230 with Z275 zinc coating. Full depth of wall system, factory notched and formed to match liner.
- .4 Insulation: as specified in Section 07 21 00.
- .5 Steel Cladding Profile, as per Section 00 01 20, Exterior Finishes Schedule:
  - .1 F-2A: Hidden Fastener System, AD300-SR Vertical Cladding, Colour: Charcoal.
  - .2 F-2B: Hidden Fastener System, AD300-SR Vertical Cladding, Colour: Light Blue.
  - .3 F-2C: Exposed Fastener System, CL 6025-SR Vertical Cladding, Colour: Bright Silver.
- .6 Fabricated from Z275 galvanized sheet steel conforming to ASTM A653M Grade 230 or AZ150 Galvalume, sheet steel conforming to ASTM A792M Grade 230, having a nominal core thickness 1.00mm (20ga - 0.0200”).
- .7 Fasteners: Stainless steel, with exposed fasteners colour matched to cladding and hidden fastener as per drawings.

## **2.2 METAL SIDING FINISHES**

- .1 Finish: Silicone Modified Polyester (SMP) coated sheet steel, prefinished to requirements of CSSB-S8-07 Baycoat “Perspectra Series” by US Steel Canada or ArcelorMittal Dofasco Inc. or Valspar Silicone Modified Polyester (SMP) System, WeatherX by Vicwest.
- .2 Include anti-gravity and anti-scratch coatings.
- .3 L800 Liner coating: Prepainted with WeatherXL™ on interior face.
- .4 Cladding coating: Prepainted with WeatherXL™ on interior face.

## **2.3 COLOUR**

- .1 L800 Liner colour to be as per Finish Schedule. Barrier coating thickness shall be 8 mils on exterior exposed surface of the finished profile and 8 mils on the reverse.
- .2 Prefinished cladding colour to be as per Finish Schedule. Barrier coating thickness shall be 8 mils on exterior exposed surface of the finished profile and 8 mils on the reverse.

## 2.4 ACCESSORIES

- .1 Fasteners:
  - .1 Colour matched stainless steel rivets, as per manufacturer's recommendations. Coordinate with Thermal Clip installation. No dissimilar materials allowed, in selection of fasteners.
  - .2 All holes are pre-drilled in the panel at same diameter
  - .3 Fixed holes include a stainless-steel grommet on the rivet stem.
  - .4 Floating holes have rivet only.
  - .5 Exposed Fasteners for use on sidings, flashing and all members: series 300 stainless steel and nylon colour coated head to match substrate colour: Atlas "ColourMate", Pioneer Screw and Nut Co., Construction Fasteners, or approved alternate.
  - .6 Concealed fasteners: No.12 self-drilling, self-tapping galvanized or stainless-steel Type 304 screws by Atlas Screw and Bolt Company, Pioneer Screw and Nut Co., Construction Fasteners, or approved alternate.
- .2 Bird and vent screen: Continuous bird and vent screen located at top and bottom of siding system, where opening is minimum 25mm (1") wide, with minimum 50% free air flow, from perforated aluminum, painted charcoal.
- .3 Flashing: Prefinished steel as specified Section 07 62 00. Material to match cladding in exposed locations, galvanized material in concealed locations. Custom fabricated to suit architectural details, as required. Use preformed corner pieces only. Double back exposed edges. Flashings at edges, top and bottom of siding system and as per architectural drawings.
- .4 Closures: Metal closures to suit profiles selected, to manufacturer's recommendations, and in accordance to ASTM A653/A653M, with minimum Z275 (G90) coating.
- .5 All associated flashings and miscellaneous items shall be of same gauge and finishes as cladding and liner as applicable.
- .6 Sealants:
  - .1 Concealed: Tape or compound, non-skinning, non-drying, butyl rubber.
  - .2 Exposed: Acrylic co-polymer to CGSB 19GP-5M or One part silicone to CGSB CAN2-19.13.
- .7 Breathable sheathing membrane: as required, AirOutshield UV Resistant Underlayment by SRP Canada, or approved alternate.



- .8 Seam tape: as required, 25mm (1") double sided tape, 30 mil. thick, to seal vertical and horizontal seams between layers of Air Outshield: Eternabond 1" D.S Seam Tape by SRP Canada, or approved alternate.

## **2.5 FABRICATION**

- .1 Fabricate roof components to comply with dimensions, profiles, gauges and details as shown on the shop drawings, including fascia and soffit panels and all companion flashing.
- .2 Fabricate all components of the system in the factory, ready for field installation.
- .3 Provide metal liner and cladding and all accessories in longest practicable length to minimize field lapping of joints.

## **3. EXECUTION**

### **3.1 EXAMINATION**

- .1 Examine work of other Sections upon which work of this Section depends.
- .2 Report all discrepancies to consultant before beginning work on the roof system.
- .3 Examine substrate surfaces to receive work and repair damaged, deteriorated or unsuitable wall areas prior to commencement of the work. Report to the Consultant in writing any defects in the substrate.
- .4 Commencement of work implies acceptance of existing conditions and assuming full responsibility for finished condition of the Work.
- .5 Surfaces to receive cladding must be smooth, dry and free from conditions that will adversely affect the execution, adhesion or quality of the work.
- .6 Do not proceed with work until substrate and job site conditions for work are acceptable.
  - .1 Do not proceed with cladding installation until all defects are repaired to comply with requirements detailed herein.
  - .2 Verify acceptability of existing site conditions with manufacturer(s)' representative with respect to condition of substrate; and that the execution, performance and quality of work will not be adversely affected by any existing conditions.
  - .3 Ensure that all flashings and other such water deflection or proofing details are completed prior to commencement of application.
  - .4 Verify site dimensions by accurate field measurements so that work will be accurately designed, fabricated and fitted to the structure.

- .5 All penetrations through the façade for the work of other trades shall be fitted with a watertight sleeve. Verify flashings are in place, sealed with waterproof membrane and covered with building membranes.
- .6 Maintain sheathing membrane integrity.

### **3.2 INSTALLATION**

- .1 Liner Sheet:
  - .1 Fasten liner sheet, together with sub-girts, to steel framing. Ensure all fasteners are driven normal to the plane of the liner.
  - .2 Interlock liner side joints and seal with butyl caulking. Lap all ends at least 100 mm (4 inches) over a support. Liner to act as air/vapour barrier.
- .2 Sub-girt framing system:
  - .1 Install notched sub-girts through liner directly to steel structure. Frame all openings in the cladding.
- .3 Flashing:
  - .1 Install starter flashing, drip and other flashing, and corners, edgings, window and door flashing as shown on the drawings.
- .4 Insulation:
  - .1 Install insulation in accordance with manufacturer's recommendations. Ensure insulation is positively fixed to liner to prevent sagging.
- .5 Exterior Cladding:
  - .1 Install exterior cladding in accordance with manufacturer's standard installation procedures, providing proper laps and detailing to ensure a weathertight face.
  - .2 Install finishing flashing and cap flashing.
  - .3 Cut and flash wall penetrations with metal flashing.
- .6 Sealants:
  - .1 Install sealants at junctions with adjoining work, and where shown on the drawings, in accordance with Section 07 92 00.

### **3.3 FIELD QUALITY CONTROL**

- .1 Independent Inspection and Testing:
  - .1 Owner may retain an independent Consultant to carry out periodic supervision during construction. If requested by Consultant, contractor to take cut-test samples of assembly, identify locations and submit to Consultant for review and testing.
  - .2 Employment of Inspection and Testing agencies does not relieve the Contractor's responsibility to perform work in accordance with the Contract Documents.

- .3 Provide assistance required for executing Inspection and Testing by the appointed agencies and/or the Consultant.
  - .4 Allow Inspection and Testing agencies and/or the Consultant access to the work.
  - .5 If required by the Inspection and Testing agency or by the Consultant, provide cuts for testing. Repair cuts without cost to the Owner.
  - .6 Contractor shall make an allowance for minimum one cut test per day and all required patching to match existing assembly.
  - .7 Failed test results will require remedial work acceptable to Consultant and may entail complete removal and replacement of failed areas.
  - .8 Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- .2 Manufacturers' Field Services, Arrange for product manufacturer's technical representative to:
- .1 Meet and discuss installation procedures and unique conditions at the Place of the Work.
  - .2 Inspect substrate surfaces and recommend solutions to accommodate adverse conditions.
  - .3 Periodically visit and inspect the installation and report unsatisfactory conditions to the Contractor.
  - .4 Attend final inspection and to submit written certification that the Products, systems and assemblies have been installed in accordance with manufacturer's requirement.

### **3.4 CLEAN-UP**

- .1 Clean exposed metal siding surfaces in accordance with manufacturer's instructions.
- .2 All adjacent areas where the cladding system has been applied shall be left free of debris and foreign substances resulting from the work.
- .3 Repair and touch up with colour matching high grade enamel minor surface damage, only where permitted by the Consultant and only where appearance after touch-up is acceptable to Consultant.
- .4 Replace damaged metal siding and components that, in opinion of the Consultant, cannot be satisfactorily repaired.
- .5 At the completion of the Work each day remove and properly store all debris, garbage, and excess materials. Regularly and frequently dispose of such material in an approved manner.

- .6 Upon completion of the Work, clean up all debris, excess materials, and equipment and remove from the site.
- .7 Cleaning should be in accordance with the requirements detailed in Section 01 74 00, Cleaning and Waste Management.
- .8 Where required, wash adjacent surfaces to remove dust, droppings, smears, and stains caused by Work of this Section.
- .9 Cleaning of tools and equipment to be performed in a manner not causing any damage and in a location acceptable to the Owner.
- .10 Leave work areas in a tidy safe and secure condition at the end of each work period.
- .11 Upon completion of the Work of this Section, leave areas affected in a condition as close to, or better than, original and as acceptable to Owner.

**END OF THE SECTION**

## 1. GENERAL

### 1.1 SYSTEM DESCRIPTION

- .1 Thermally Broken Structural Clips: provide low-conductivity, thermally broken structural clips to maintain effectiveness of assemblies' R-values. Acceptable Products:
  - .1 Design is based on iClad Rainscreen Substructure System by Spring Valley:  
[www.springvalleycorp.com](http://www.springvalleycorp.com).
  - .2 Cascadia Clip: [www.cascadiawindows.com](http://www.cascadiawindows.com)
  - .3 T-Clip Thermally Broken Façade Substructure: [www.engineeredassemblies.com](http://www.engineeredassemblies.com)
- .2 Sequencing: Coordinate installation with other related Sections.

### 1.1 RELATED SECTIONS

- .1 Section 02 06 00: Selective Demolition
- .2 Section 04 20 00: Unit Masonry
- .3 Section 05 41 00: Structural Steel Stud Framing System
- .4 Section 05 50 00: Metal Fabrications
- .5 Section 06 10 00: Carpentry
- .6 Section 07 20 00: Insulation
- .7 Section 07 21 19: Spray-in-place Urethane Foam Insulation
- .8 Section 07 27 00: Air / Vapour Barrier
- .9 Section 07 42 00: Wall Panels
- .10 Section 07 46 19: Steel Siding
- .11 Section 07 52 00: Membrane Roofing - SBS
- .12 Section 07 62 00: Sheet Metal Flashing and Trim
- .13 Section 07 90 00: Joint Sealants.
- .14 Section 08 17 13: Entry Doors and Frames.
- .15 Section 08 42 00: Fibreglass Window
- .16 Section 09 25 00: Gypsum Wallboard
- .17 Section 09 91 00: Painting

### 1.2 SUBMITTALS

- .1 Submit shop drawings including fabrication and erection documents and materials list in accordance with Section 01 33 00 and 01 77 00.
- .2 Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for Thermally Broken Rain Screen Attachment System and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Product transportation, storage, handling and installation requirements.
- .3 Shop Drawings:
  - .1 Submit drawings and calculations stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada. Indicate relevant details
  - .2 Indicate on drawings, all relevant details, such as depth, spacing, bridging lines, bearing and anchorage details.
  - .3 Indicate particulars, on shop drawings, relative to Thermally Broken Rain Screen Attachment System, framed openings, bearing and anchorage details. Include member size, spacing, properties, specified and factored member loads, and stresses under various loadings, deflection and camber.
  - .4 Complete engineering design data to confirm that Thermally Broken Rain Screen Attachment System meet design requirements specified.
- .4 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .5 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .6 Ensure Fabricator drawings showing designed assemblies, components and connections are stamped and signed by qualified professional engineer licensed in the province of Ontario, Canada.
- .7 Provide two and/or three-dimensional analysis thermal reports of the assembly, showing that overall net thermal resistance meets the overall performance requirements, a minimum of R-40.

### **1.3 QUALITY ASSURANCE**

- .1 Retain a Professional Engineer, licensed in Province of Ontario, with experience in Work of comparable complexity and scope, to perform following services as part of Work of this Section:
  - .1 Design of Thermally Broken Rain Screen Attachment System.
  - .2 Be responsible for full assemblies and connections.
  - .3 Be responsible for determining sizes, joint spacing to allow thermal movement and loading of components in accordance with applicable codes and regulations.
  - .4 Be responsible for production and review shop drawings.

- .5 Inspect work of this section during fabrication and erection.
- .6 Stamp and sign each shop drawing.
- .7 Conduct shop and on-site inspections, prepare and submit written inspection reports verifying that this part of Work is in accordance with Contract Documents and reviewed shop drawings.
- .2 Certification:
  - .1 Submit certification from registered professional structural Engineer registered in province of Ontario, who shall affix his/her seal and signature to certificate, stating structure is capable of supporting its own weight and specified live loads.
  - .2 Submit certificate from professional Engineer responsible for design which includes field review of this part of the work, validating that work substantially complies with requirements of the OBC and that requisite field reviews have been completed.

#### **1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .4 Replace defective or damaged materials with new.

### **2. PRODUCTS**

#### **2.1 PERFORMANCE REQUIREMENTS**

- .1 Design a thermally broken cladding support system, pressure-equalized and fully drained rainscreen system: no water infiltration into the building envelope under design wind loads of the OBC.
- .2 Gauge, Configuration, Dimensions, and Spacing: Minimum 16 gauge and as needed to conform to design criteria for each assembly. System to provide compliance to ASHRAE 90.1 and thermally broken façade requirements of the building code.
- .3 Cladding component attachment, and their gauges to be finalized by cladding manufacturer.
- .4 Thermal performance requirement: Effective R Value to be R-40 or that provided on drawings.
- .5 Material: ASTM A635M, Coating Designation Z100 min.

- .6 Wall Brackets: design based on iClad Rainscreen.
  - .1 L-Style Thermal Bracket (150mm)
  - .2 Vertical Girt (20mm)
  - .3 Horizontal Girt or Hat Channel (25mm) – typical spacing determined by metal siding
  - .4 Minimum 0.046-inch-thick (16 gauge) sheet steel.
  - .5 Pre-Punched Holes: For minimum two wall anchors per bracket.
  - .6 Dimensions: As needed to offset cladding from wall plane where meeting substrate and to allow for installation of insulation equal in thickness to offset.
    - .1 Bracket Base Dimension – Minimum 6.625 inch (168mm) high and 2.125 inch (54mm) wide
    - .2 Offset Brackets – minimum 6 inch (152mm).
    - .3 Typical spacing:
      - .1 Minimum 16 inch (405mm) O/C horizontally and minimum 32 inch (810mm) O/C vertically, to be finalized by Thermally Broken Rain Screen Attachment System Engineer to suit loading requirement.
- .7 Substructure: to be provided by manufacturer, size and spacing as per manufacturer's recommendation, coordinate with steel siding.
  - .1 Vertical Girts:
    - .1 Vertical girts fastened to thermal clips, are min. 12 gauge thick, galvanized zinc-coated steel to ASTM A653 with Grade A coating Z275. Matching insulation thickness.
    - .2 Shop Primers: Provide primers that are compatible with paint systems specified in Section 09 91 00.
    - .3 Prefomed galvanized steel girts to be used at inside and outside corners to ensure corners are straight and closed visually, and used at intermediary siding locations and where panels come together.
    - .4 Girt spacing as determined by manufacturer and approved by structural engineer.
  - .2 Horizontal Girts:
    - .1 Horizontal girts are min. 16 gauge thick, galvanized zinc-coated steel to ASTM A653 with Grade A coating Z275.
    - .2 Prefomed galvanized metal sheet, min. 16 gauge thick, minimum base steel nominal thickness, notched or perforated for drainage.



- .3 Girt locations as determined by manufacturer and approved by structural engineer, to align with metal siding fasteners spaced based on manufacturer's load data.
- .4 Girts to allow ventilation. Cavity behind panel: Minimum 25mm (1") of unrestricted space.
- .3 Substructure to account for control joints of building to ensure a girt is not connected across the control joint.
- .4 Install sidings across one set of girts to ensure that expansion and contraction of the substrate is controlled within framing members.

## **2.2 RAIN SCREEN COMPONENTS THERMAL ISOLATION**

- .1 Insulation Material: Injection molded Polypropylene Impact Copolymer non-fibre reinforced
- .2 Tensile Modulus: 182.75 per ISO 527-2/1
- .3 Melting Temperature: 318 degrees Fahrenheit (159°C) per ISO 3146
- .4 Rockwell Hardness: 88 as per ASTM D785
- .5 Size: as per details

## **2.3 CONNECTORS AND ANCHORS**

- .1 Colour matched stainless steel rivets, as per manufacturer's recommendations. No dissimilar materials allowed, in selection of fasteners.
- .2 All holes are pre-drilled in the siding at same diameter.
- .3 Fixed holes include a stainless steel grommet on the rivet stem.
- .4 Floating holes have rivet only.
- .5 For attachment to existing masonry substrate:
  - .1 Embedment depth: 4 inches (102mm) minimum.
  - .2 Minimum ultimate pull-out capacity from substrate material: 450 pounds.
  - .3 Min. 4 inch (102mm) Hilti Kwik-Con II+ Concrete and Masonry Screw, or approved equivalent.
- .6 For wood stud framing substrate: Hilti trim head screw 6x1-5/8" SFH, or approved equivalent.
  - .1 Embedment depth: 0.625 inches (15.9mm) or three full threads minimum, whichever is greater.
  - .2 Minimum ultimate pull-out capacity from min. 18 gauge steel: 450 pounds

- .7 For horizontal rail to vertical rail connection: Self-drill hex-washer-head stainless steel with 1,000 hour salt-spray rated thermoset polyester coating.
  - .1 Embedment depth: 0.625 inches (15.9mm) or three full threads minimum, whichever is greater.
  - .2 Minimum ultimate pull-out capacity from min.18 gauge steel: 450 pounds
- .8 Provide all components and accessories as required for complete and secure installation of thermal clip system.

### **3. EXECUTION**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

#### **3.2 CONNECTION TO EXISTING WORK**

- .1 Verify dimensions and condition of existing work before commencing fabrication and report any discrepancy and potential problem areas to Consultant and await instructions.
- .2 Remove existing stucco and place the Thermal Brackets against the existing masonry.

#### **3.3 FIELD QUALITY CONTROL**

- .1 Owner may engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

#### **3.4 CLEANING**

- 1. Clean all contaminants generated by Thermally Broken Rain Screen Attachment System from building and surrounding areas.
- 2. Repair or replace building components and finished surfaces damaged or defaced due to the work of this section; comply with recommendations of manufacturers of components and surfaces.
- 3. Remove leftover materials, trash, debris, equipment from project site and surrounding areas.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

1. All work of this Section to conform to the appropriate requirements of the most recent edition of the Ontario Building Code, Canadian Roofing Contractors Association Roofing Manual, and the National Roofing Contractors Association Roofing and Waterproofing Manual.
2. Coordinate work of this Section, and with other related sections, to ensure satisfactory and expeditious completion of the Work.
3. Review and update all work schedules with Consultant on a regular basis.
4. Examine the Work of this, and all related sections, to confirm the extent, location, quality, and condition prior to commencing.
5. Discontinue work during severe rain, wind, heat, cold, or other such inclement weather and monitor time lost in relation to Environment Canada daily norms. Lost time will only be considered where actual conditions exceed norms.

### **1.2 RELATED SECTIONS**

- .1 Section 02 06 00: Selective Demolition
- .2 Section 04 20 00: Unit Masonry
- .3 Section 05 41 00: Structural Steel Stud Framing System
- .4 Section 05 50 00: Metal Fabrications
- .5 Section 06 10 00: Carpentry.
- .6 Section 07 20 00: Insulation
- .7 Section 07 21 19: Spray-in-place Urethane Foam Insulation
- .8 Section 07 27 00: Air / Vapour Barrier
- .9 Section 07 42 00: Wall Panels
- .10 Section 07 46 19: Steel Siding
- .11 Section 07 48 13: Thermally Broken Rain Screen Attachment System
- .12 Section 07 62 00: Sheet Metal Flashing and Trim
- .13 Section 07 90 00: Joint Sealants.
- .14 Section 09 25 00: Gypsum Wallboard

### **1.3 REFERENCES**

- .1 Referenced Standards: These standards form part of this specification only to the extent they are referenced as specification requirements.

- .1 CAN/ULC S704-03 - Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
- .2 ASTM D 1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2001.
- .3 CGSB 37-GP-9 - Primer, Asphalt for Asphalt Roofing, Dampproofing and Waterproofing.
- .4 CGSB 37GP - 50M Rubberized Asphalt Membranes.
- .5 CGSB 37.50 - M89 Asphalt, Rubberized, Hot Applied, for Waterproofing and Waterproofing.
- .6 CAN/CSA A123.4 - Bitumen for Use in Construction of Built-Up Roof Coverings and Waterproofing Systems.
- .7 CAN/CGSB 37-GP-56M Membrane Modified Bituminous, Prefabricated and Reinforced for Waterproofing
- .8 ASTM C 136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2005.
- .9 ASTM C 208 - Standard Specification for Cellulosic Fiber Insulating Board; 1995 (Reapproved 2001).
- .10 ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2004.
- .11 ASTM D 312 - Standard Specification for Asphalt Used in Roofing; 2000.
- .12 ASTM D 1079 - Standard Terminology Relating to Roofing, Waterproofing, and Bituminous Materials; 2005a.
- .13 ASTM D 1863 - Standard Specification for Mineral Aggregate Used on Built-Up Roofs; 2003.
- .14 ASTM D 2178 - Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing; 2004.
- .15 ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2000.
- .16 ASTM D 4601 - Standard Specification for Asphalt-Coated Glass Fiber Base Sheet Used in Roofing; 2004.
- .17 ASTM D 6152 - Standard Specification for SEBS-Modified Mopping Asphalt Used in Roofing; 1999.
- .18 ASTM D 6162 - Standard Specification for SBS Modified Bitumen Sheet Materials

- using a combination of polyester and fibreglass reinforcement.
- .19 ASTM D 6163 - Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements; 2000.
  - .20 ASTM D 6164 - Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements; 2000.
  - .21 ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2005.
  - .22 CAN-ULC-S770 - Standard Test Method Determination of L-Term Thermal Resistance of Closed-Cell Thermal Insulating Foams; 2003.
  - .23 CAN-ULC S 701-11 Thermal Insulation, Polystyrene Boards and Pipe Coverings.
  - .24 CAN/ULC-S704 - Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
  - .25 CAN-ULC S 107-10 Methods of Fire Testing Roof Coverings
  - .26 FM 4470 - Approval Standard - Class I Roof Covers; 1986.
  - .27 PS 1 - Construction and Industrial Plywood; 1995.
  - .28 PS 20 - American Softwood Lumber Standard; 2005.
  - .29 CRCA Canadian Waterproofing Contractors' Association Waterproofing Specification Manual.
- .2 NRCA National Roofing Contractors' Association Waterproofing Manual.
  - .3 Identify any revisions to the referenced standards and notify Consultant of same.
  - .4 Conform to most stringent requirements of referenced standard or revision.

#### **1.4 SUMMARY**

- .1 Work Included:
  - .1 Installation of new roof. Replace existing roof. Existing deck and below to stay in place and maintained.
  - .2 Furnish all labour, materials, equipment and services necessary for complete replacement of the roof, with new 2-ply modified bitumen roofing membrane on the low-slope roofs of the townhouse units.
  - .3 Furnish all labour, materials, equipment and services necessary for complete installation of new 2-ply modified bitumen roofing membrane on the new built up canopy roofs.
  - .4 Remove, relocate, alter and/or re-install all carpentry items as required for the work or as noted on the drawings. Coordinate this work with Section 06 10 12.

- .5 All cutting, fitting and trimming of carpentry items as required by other trades. Coordinate this work with Section 06 10 12.
- .6 Repair and/or replacement of deteriorated roof sheathing such that sheathing surfaces are sound, securely fastened to existing framing, and suitable to accept new roofing system.
- .7 Remove and replace the existing cap flashings.
- .8 Temporary removal and/or protection of existing equipment on the roof not designated for replacement.
- .9 Engage solar panel service contractor for the purpose of including, but not limited to reinstating the connections of the Solar panel system, on roof of unit #50 – 56; inspect the integrity of structural & fastening system; report any existing corrosion; and obtain necessary certification to maintain the existing warranty.
- .10 Supply and installation of new metal flashings and sloped metal roofing/cap flashings above party walls as indicated and/or specified/directed. Coordinate this work with Section 07 62 00.
- .11 Supply and installation of new sheet metal and metal flashings, refer to Exterior Finish Schedule, 00 01 20. Coordinate this work with Section 07 46 19.
- .12 Install all sealant materials. Coordinate this work with Section 07 62 00.

## **1.5 SUBMITTALS**

- .1 Product Data:
  - .1 Provide membrane manufacturer's printed data sufficient to show that all components of roofing system, including insulation and fasteners, comply with the specified requirements and with the membrane manufacturer's requirements and recommendations for the system type specified; include data for each product used in conjunction with roofing membrane.
  - .2 Submit design uplift pressures from manufacturer, showing an adhesive fastening pattern to resist uplift pressures. Showing conformance to local wind pressure design loads.
  - .3 Submit typical membrane flashing details, base/ cap modified bitumen membrane configurations.
  - .4 Submit tapered insulation shop drawing.
  - .5 Submit design of securement of wood structural components, such as parapets, etc.
- .2 Submit roof shop drawings showing all relevant manufacturer recommended details.

- .3 Shop drawings should show roof plan with locations of storm water drainage pathways that show effective roof drainage and do not promote ponding, locations of sloped insulation (sumps at drains, crickets etc.). Shop drawings shall also include designed roof assembly, including adhesive patterns that safely resist wind uplift pressures, in accordance with CSA A123.21.
- .4 Provide Manufactures System Letter for CSA A123.21.
- .5 Submit Material List to Consultant for review prior to ordering material and commencing Work.
- .6 Installer Qualifications: Letter from manufacturer attesting that the roofing installer meets the specified qualifications
- .7 Pre-Installation Notice: Copy to show that manufacturer's required Pre Installation Notice (PIN) has been accepted and approved by the manufacturer Executed Warranty.
- .8 Prior to placement of waterproofing materials or primers, provide manufacturer's written certification that the surface preparation is satisfactory; that the materials proposed are suitable for the application, and are compatible with all existing materials which are to remain. Include, where applicable, instructions from the manufacturer(s) relating to the procedures to be utilized to obtain a durable seal between subsequent applications of waterproofing materials at joints and between adjacent phases of the work.
- .9 Samples: Submit samples of each product to be used.
- .10 Submit samples of selected waterproofing system to Consultant as examples of finished colour and texture for Owner's approval.
- .11 Submit shop drawings for design of required walkway guards sealed by a professional engineer registered in the Province of Ontario.
- .12 Manufacturer's written instructions regarding surface preparation and application procedures.
- .13 Evidence that the roofing membrane is a Class A listed with ULC.
- .14 Evidence that the roofing membrane is listed as a Class 1 Roof Cover with Factory Mutual Research Corporation.

## **1.6 QUALITY ASSURANCE**

- .1 Provide work in this section, executed by competent installers with minimum five (5) years documented experience in application of products, systems and assemblies specified and with approval from the manufacturer
- .2 Applicator Qualifications: Pre-Qualified Roofing installer shall have the following:



- .1 Current Firestone Red Shield Licensed Contractor status for the past 10yrs, or approved alternate.
- .2 Triumph Roofing, or approved alternate.
- .3 Pre-Installation Conference: Before start of roofing work, Contractor shall hold a meeting to discuss the proper installation of materials and requirements to achieve the warranty.
  - .1 Require attendance with all parties directly influencing the quality of roofing work or affected by the performance of roofing work.
  - .2 Notify Consultant well in advance of meeting.
- .4 A contractor approved by the manufacturer shall apply all waterproofing materials. Upon request, provide written evidence of approval from manufacturer prior to commencement of work.
- .5 Independent Inspection and Testing:
  - .1 Owner may retain an independent Consultant to carry out periodic supervision during construction. If requested by Consultant, contractor to take cut-test samples of roofing membrane and membrane flashings, wrap and label samples, identify locations and submit to Consultant for review and testing.
  - .2 Employment of Inspection and Testing agencies does not relieve the Contractor's responsibility to perform work in accordance with the Contract Documents.
  - .3 Provide assistance required for executing Inspection and Testing by the appointed agencies and/or the Consultant.
  - .4 Allow Inspection and Testing agencies and/or the Consultant access to the work.
  - .5 If required by the Inspection and Testing agency or by the Consultant, provide cuts for testing. Repair cuts without cost to the Owner.
  - .6 Contractor shall make an allowance for minimum one cut test per day and all required patching to match existing assembly. Samples must be a minimum 305 x 305 mm (12 x 12 in.) and include all new roof components.
  - .7 Failed test results will require remedial work acceptable to Consultant and may entail complete removal and replacement of failed areas.
  - .8 Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- .6 Flood test waterproofed areas, and review with Consultant performance of materials during the test period in strict accordance with this Specification.
- .7 Arrange for manufacturer's technical representative to attend site meeting with Contractor and Consultant prior to the commencement of any waterproofing work to discuss the

- following:
- .1 Analysis of job and weather conditions;
  - .2 Verification of finish requirements and suitability of deck;
  - .3 Surface preparation procedures;
  - .4 Crack and cold joint preparation;
  - .5 Application requirements; and
  - .6 Aesthetic concerns.
- .8 At no extra cost, arrange for the waterproofing manufacturer(s) to conduct all field tests required to ascertain that full bond between waterproofing and substrate materials is attainable and that primers, sealants and other materials are mutually compatible. The manufacturer shall provide written copies of such tests when requested and/or deemed necessary.
  - .9 Contractor is to complete "Fire watch" documentation on a daily basis. After each work period, the contractor must monitor the roof for signs of potential fire for a minimum of 2 hours after all torch work has stopped. Contractor should document this activity each work period and submit to Consultant.
  - .10 The use of liquid asphalt is prohibited.

#### **1.7 MOCK-UP**

- .1 Provide mock-up of Membrane Roofing in accordance with section 01 75 00.
- .2 Construct typical Membrane Roofing in conjunction with section 01 75 00.
- .3 Acceptance of mock-up sample may form part of the completed work.
- .4 Do not commence work until sample installation has been accepted.
- .5 Acceptance of sample preparation will be a reference for minimum acceptance of the work. Any need for deviation of the mock-up acceptance shall be reported in writing.
- .6 Upon consultant request, provide in writing manufacturer acceptance of the mock-up quality.

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

- .1 Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact and legible.
- .2 All modified bitumen membranes that will be used for installation on a daily basis must be stored at a minimum of 15°C (58°F) for a period of at least 4 hours prior to application. Stand rolled materials on end and protect edges.

- .3 Keep combustible materials away from ignition sources.
- .4 Provide materials in quantities sufficient for a maximum of 2 days application. Arrange for daily deliveries wherever possible.
- .5 Limited storage space will be available at the site. Obtain Owner's approval of the location and extent of all on-site storage areas.
- .6 Protect work of other sections from damage while performing roofing work. Provide tarpaulins and other coverings, as required, to protect lower and adjacent walls, finishes and surfaces. Additional protection shall be provided if instructed by Consultant.
- .7 Store all materials in such a manner so as to protect them from precipitation, ground moisture, ultraviolet degradation, sunlight and temperature extremes, and all construction activities by use of weather protective, waterproof coverings and raised platforms. Interior storage shall be employed when and where necessary, with the express written consent of the Owner.
- .8 Plastic wrapping installed at the factory is not to be used as an outside storage cover. Emulsions must be maintained at temperatures above freezing.
- .9 Immediately remove and dispose of wet or damaged materials off site. Do not hoist materials with straps/ropes that damage materials.
- .10 Hoist material to roof surface on a daily basis, for same day use.
- .11 Maintain storage temperature and keep in well ventilated space in strict accordance with manufacturer's written instructions
- .12 Accessory materials such as bonding agents and admixtures shall be stored at temperatures appropriate for those materials.
- .13 Pallets of materials shall not be double stacked.
- .14 Store and handle materials in strict accordance with manufacturer's written instructions. Obtain manufacturer's written directions for any deviations from standard product literature.
- .15 Place and store roll materials on end.
- .16 Protect materials from freezing. Materials suspected of having been subjected to freezing are not to be used unless the manufacturer verifies, in writing, that the material has not been damaged.
- .17 Remove and replace any damaged, wet or broken materials.
- .18 Store materials away from open flame or ignition sources.
- .19 Do not transport any materials through the building.
- .20 Follow precautionary statements or product labels for storage and handling before use

and make reference to applicable Material Safety Data sheets.

- .21 Do not stock-pile roof, and roofing materials. General Contractor is responsible for determining maximum roof loading, and its suitability to carry the load.

### **1.9 TEMPORARY FACILITIES**

- .1 Provide temporary storage facilities for materials, tools and equipment. Location to be approved by General Contractor and Owner.
- .2 Ground work stations shall be fully enclosed by temporary fencing and be manned at all times.

### **1.10 JOB SITE CONDITIONS**

- .1 Prior to installation, inspect those areas to receive the waterproofing materials to ensure that they are clean, dry, sound and conform to manufacturer's requirements.
- .2 Do not apply materials when ambient air temperature or concrete temperature is less than 0°C.
- .3 Do not apply materials in rain, fog, sleet, extreme sunlight or excessive wind.
- .4 Commencement of work implies acceptance of the surfaces and conditions as being suitable.

### **1.11 ENVIRONMENTAL AND SAFETY REQUIREMENTS**

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of material safety data sheets acceptable to Occupational Health and Safety requirements.
- .2 Conform to manufacturer's recommended temperature, relative humidity, and substrate moisture content for application and curing of materials including special conditions governing use.
- .3 Do not breathe vapours or use near an open fire. Do not use in confined areas without adequate ventilation.
- .4 Arrange for the building staff to operate ventilation systems on maximum outdoor air and exhaust during interior installation and curing of waterproofing materials.
- .5 Ventilate area of work as required by use of approved portable supply and exhaust fans. Provide a fresh air supply.
- .6 During application and curing of materials protect workers and public from vapours and

- direct contact of materials with skin or eyes.
- .7 Workers shall use an approved self-contained breathing apparatus where insufficient ventilation is available.
  - .8 Do not install roofing when temperature remains below 0°F (-18°C) for torch applications and 23°F (-5°C) for asphalt applications.
  - .9 Installation of any roof components during inclement weather is not permitted.
  - .10 Fire extinguishers must be on site within 3 m (10 ft.) and at same level as torch applicator. Maintain adequate fire watch (as recommended by membrane manufacturer) after each days roofing operations cease.
  - .11 Prior to leaving site, use digital thermometer to scan roof surface temperature for 'any hot spots' and address them accordingly.

#### **1.12 WARRANTY**

- .1 Comply with all warranty procedures required by manufacturer, including notifications, scheduling, and inspections.
- .2 The work described in this Section shall be guaranteed against all defects in materials and workmanship for a ten (10) year period from the date of Substantial performance of the Work. Carry out all repair work during warranty period as directed by Consultant and at no additional cost to the Owner.
- .3 Submit each warranty:
  - .1 Identifying the party as warrantor/guarantor.
  - .2 Issued in both the Contractor's and Owner's names.
  - .3 Including labour and materials for removal, repair and/or replacement of products provided as part of the Work and adjacent damaged materials.
- .4 The warranty shall cover the replacement or repair of the waterproofing materials and associated work as the result of faulty materials and/or workmanship.
- .5 Defects include, but are not limited to: adhesive or cohesive failure of the system; weathering deficiencies; waterproofing failure resulting from substrate cracking up to 1/16" (1.6mm) in width.
- .6 The warranty shall cover the repair and replacement of any waterproofing materials damaged by deterioration of the substrate, whether new or existing.
- .7 Promptly correct, at no expense to the Owner, any defects or deficiencies that become apparent within the warranty period.
- .8 Warranty: Firestone 10 year Red Shield Limited Warranty covering membrane, roof

- insulation, and membrane accessories, or approved alternate. Provide manufacturer's acceptance letter that installed membranes meet their ten year' warranty requirements.
- .1 Roof membrane manufacturer's Warranty for labour, materials and workmanship with No Dollar Limit (NDL).
  - .2 Scope of Coverage: Repair leaks in the roofing system caused by:
    - .1 Ordinary wear and tear of the elements.
    - .2 Manufacturing defect in materials.
    - .3 Defective workmanship used to install these materials.
    - .4 Damage due to winds up to 55 mph (88 km/h).
  - .3 Repair leaks into building or roofing assembly within 24 hours of notification. Repair all roof membrane deficiencies, including ridges, blisters, splits and bare spots.
  - .4 Defects will include but will not be limited to; leaking, blisters, failure to stay in place, lifting, deformation, separation, seam failure.
  - .5 No scheduled inspection required to be arranged by Owner in order to maintain warranty. Scheduled inspection to maintain warranty shall be provided by Manufacturer.
  - .6 General contractor to provide a set cost for certain time periods of roof inspection:
    - .1 Provide separate fees for inspections after 2, 5, and 10 years.
  - .9 Metal roof edging with exposed decorative fascia: Provide 10 year warranty for painted finish covering color fade, chalk, and film integrity.

## **2. PRODUCTS**

### **2.1 MANUFACTURERS**

- .1 Acceptable Manufacturer - Roofing System: Firestone Building Products Canada, Mississauga, ON. [www.firestonebpc.com](http://www.firestonebpc.com), Soprema, Bakor, or approved alternate.
- .2 Manufacturer of insulation and cover boards: Same manufacturer as roof membrane.
- .3 Manufacturer of metal roof edging: Same manufacturer as roof membrane.
  - .1 Field- or shop-fabricated metal roof edgings are acceptable, provided they are fabricated with membrane manufacturer's metal.

### **2.2 MATERIALS**

- .1 Conduit Line Supports: Fabricated from pressure treated lumber with a 100 mm x 100 mm (4 x 4 in.) base and 50 mm x 100 mm (2 x 4 in.) spacers to suit elevations and resting on pre-fabricated pressure treated wood supports on waterproofing membrane, including

- straps, clamps, brackets and other accessories to secure pipe to wood blocking. Blocks to be a minimum of 305 mm (12 in.) long. Secure wood blocking in accordance with Section 06100 – Rough Carpentry. Confirm roof loading.
- .2 Securement bars: 3 mm x 25 mm, formed aluminum with elongated fastening holes at 100 mm o/c, 3050 mm lengths, as supplied by membrane manufacturer.
  - .3 Securement bar fasteners: stainless steel, 50 mm length or as required to suit site condition, as supplied by membrane manufacturer.
  - .4 Adhesive to glue the entire assembly together: as per manufacturer's recommendation.
  - .5 PMMA liquid flashing: Soprema Alsan, or approved alternate.
  - .6 Metal Flashings: As specified in Section 07 62 00.
  - .7 Sealants: As specified in Section 07 90 00.
  - .8 Drainage Scuppers: 0.8mm (16 oz) pre-finished steel, colour to match parapet flashings, open-box-type scupper with continuous and fully soldered seams, continuous 100mm flange long throat, and 150mm x 150mm (6 in. x 6 in.) receiver box. All seams must be continuously soldered. Outlet is to be covered with perforated copper strainer, soldered in place. Scupper is to include gravel-stop lip with notches, to allow water flow into outlet. Ensure flange is continuous by filling in outside corners. Apply isolation coating on deck flange.
  - .9 Downspouts: Fabricated from 0.56 mm (16 oz.) Copper or 0.71mm (24 ga.) stainless steel, minimum 95mm (3 ¾ in.) diameter downspout complete with all elbows, brackets, reducers and accessories.
  - .10 Vent Stack Covers: Vent (Soil, Plumbing) Pipe Sleeves: One piece spun aluminum, uninsulated accessories (add insulation and seal to interior in the field), with EPDM double pressure grommet seal, aluminum flanged sleeve and covering cap. Diameter and height to suit site conditions. Ensure there is no melting or shrinkage of the insulation.
  - .11 Roof penetration seal system: Chem Curb, or approved alternate.
  - .12 Sprayed polyurethane foam insulation: one component polyurethane foam insulating sealant to CAN-ULC Standards (Refer to Section 1.5, Reference Standards). Acceptable product:
    - .1 ENERFOAM by Abisko Manufacturing Inc. or approved alternative.
  - .13 Pitch Boxes: 0.8mm (16 oz). copper pitch box with continuous and fully soldered seams, continuous 100mm flange (4in.). Boxes shall be minimum of 250mm high above finished roof surface, all seams must be continuously soldered. Apply isolation coating on deck flange.

- .1 Pitch Box Filler: M-1 and 1-Part adhesive sealer materials as manufactured by Chem Link Products Inc. LLC., Inter Clip System by Soprema Inc., or approved alternative.

### 2.3 ROOFING SYSTEM DESCRIPTION

- .1 Roofing System:
  - .1 Membrane: SBS modified bitumen, 2 ply.
  - .2 Thickness: As specified elsewhere.
  - .3 Membrane Attachment: Self-adhered base, torch applied cap
  - .4 Comply with applicable local building code requirements.
- .2 Submit a document issued by Authorities having jurisdiction certifying that roof system meets requirements of CAN/ULC-S107 "Fire Tests of Roof Coverings", Class A, B or C.
- .3 Primers:
  - .1 Asphalt primer to CGSB 37-GP-9Ma, or approved alternate, as recommended by the waterproofing membrane manufacturer.
  - .2 Elastocol Stick by Soprema Inc. (for self-adhesive membranes), or approved alternative.
  - .3 Elastocol 500 by Soprema Inc. (for heat welded membranes), or approved alternative.
- .4 Polyisocyanurate Roof Insulation Manufacturers shall be members of Polyisocyanurate Insulation Manufacturers Association (PIMA). Manufacturer shall submit documentation listing their LTTR values based on CAN/ULC and ASTM test methods for 2014.
- .5 Overlay Board: 13mm x 1220 x 1220 mm (1/2 in. x 4 ft. x 4 ft.) high density, asphalt impregnated and coated fibreboard, 'RoofRite High Density' by International Bildrite Inc., or approved alternate.
- .6 Insulation:
  - .1 Total R Value: R-50, minimum, includes 1/2" HD Cover Board
  - .2 Board Thickness: 4 inches (102 mm); use as many layers as necessary (2 layers); stagger joints in adjacent layers and 1 inch (25.4mm), with tapered sleepers as shown on the drawings.
  - .3 Base Layer: Polyisocyanurate foam board, inorganic, fiberglass facer.
  - .4 Top Layer: Polyisocyanurate foam board, inorganic, fiberglass facer.
  - .5 Attachment: ISO Twin Pack low-rise foam adhesive by Firestone, or approved alternate.
  - .6 Alternatively, no tapered sleepers, board thickness: 2.75 inches (70 mm); use as many layers as necessary (3 layers); stagger joints in adjacent layers and tapered



Firestone ISO 95+ GL (25.4mm) or approved alternate.

- .7 Top Layer Cover Board: High density polyisocyanurate foam board, 1/2 inch (12 mm) thick. R value 2.5 minimum, 120 PSI minimum
  - .1 Attachment: ISO Twin Pack low-rise foam adhesive by Firestone or approved alternate.
  - .2 Do not torch High density polyisocyanurate board, apply an asphalt-impregnated board. For torching, all the seams must be taped.
- .8 Crickets: Tapered insulation of same type as specified for top layer; slope as indicated.
  - .1 Attachment: ISO Twin Pack low-rise foam adhesive by Firestone, or approved alternate.
- .9 Mechanical Fasteners for cover-board at parapet: Factory Mutual (FM) Class 1, No.12 coated screws, 38 mm (1-1/2 in.) long and 75 mm (3 in.) galvalume metal plate. Fasteners shall penetrate crest of metal deck 19 mm (3/4 in.).

## **2.4 SBS MODIFIED BITUMEN MATERIALS**

- .1 Cap Sheet: Granule surfaced SBS polymer-modified bitumen sheet, reinforced with non-woven polyester fabric of 250 g/m<sup>2</sup>, complying with CGSB 37-GP-56M, Type 1, Class A, Grade 1, formulated torch application. Bottom surface shall be covered with a torchable poly-film and the top completely covered with ceramic granules, with the following additional characteristics:
  - .1 Formulated for torch application.
  - .2 Reinforcing Fabric: 265 g/m<sup>2</sup> (7.8 oz/yd<sup>2</sup>) polyester, with continuous fiberglass strands in machine direction.
  - .3 Nominal Thickness: 0.158 inch (4.1 mm).
  - .4 Post-Consumer Recycled Content: 5 percent, nominal.
  - .5 Sheet Width: 3.3 feet (1 m), nominal.
  - .6 Provide Modified Bituminous Membrane Cap Sheet Flashings.
  - .7 Granule Color: provide full range of colour for Consultant's approval.
- .2 Acceptable Product: SBS Premium Torch by Firestone, Sopralene Flam 250 GR by Soprema Inc., ModifiedPLUS NP 250g T4 by Bakor Inc., or approved alternate.
- .3 Mastic: Sopramastic by Soprema Inc., or approved alternate.
- .4 Self-adhesive, flame-stop tape with glass mat reinforcement: Sopraguard Tape, or approved alternate.
- .5 Round Top Cap Nails: Ardox spiral shank with 25 mm (1 in.) steel washer, or approved

- alternate.
- .6 Base Sheet: consists of a Styrene-Butadiene-Styrene (SBS) rubber modified, self-adhesive asphalt blend reinforced with a 180 grams/m<sup>2</sup> fiberglass mat and coated with a fine mineral release agent on the top surface and an opaque release film on the bottom surface, and with the following additional characteristics:
    - .1 Nominal Thickness: min. 2.2 mm.
    - .2 Sheet Width: 3.3 feet (1 m), nominal.
    - .3 Colour to be chosen by Consultant.
    - .4 Acceptable Product: BaseGard SA by Firestone, Sopraflash Flam Stick by Soprema Inc., or approved alternate.
  - .7 Modified Bituminous Membrane Base Sheet Flashings, same materials and configuration as roofing membrane:
    - .1 Elastophene 180 PS by Soprema Inc., or approved alternate.
    - .2 Sopralene Flam 180 by Soprema Inc. (for flanges), or approved alternate.
    - .3 Sopralene Flam Stick and Elastocol Stick Primer where torching is not safe, or approved alternate.
  - .8 Provide manufacturers' recommendations regarding modified-bitumen membrane flashings.
    - .1 Base / cap modified bitumen membrane configurations are not shown, General Contractor has to follow printed manufacturer instructions.
  - .9 Modified Bituminous Membrane Liquid Flashings: Polyurethane/bitumen resin 'Alsan Flash' and fabric reinforcement by Soprema Inc., or approved alternate.

## **2.5 ROOF INSULATION AND COVER BOARD**

- .1 Polyisocyanurate Board Insulation: rigid closed cell polyisocyanurate foam core laminated to a specially coated, inorganic, fiberglass facer, bonded with all fibre glass reinforced facer on each side. Minimum long-term thermal resistance (LTTR) of RSI 1.00 per 25 mm (R5.7 per inch). Provide 63 mm & 50 mm (2 & 2-1/2 in.) for 1220 x 1220 mm (48 x 48 in.) at drain. Comply with CAN/ULC-S704, Type 2, Class 2, with the following additional characteristics:
  - .1 Thickness: As indicated on the drawings.
  - .2 Size: 48 inches (1220 mm) by 96 inches (2440 mm), nominal.
    - .1 Exception: Insulation to be attached using adhesive or asphalt may be no larger than 48 inches (1220 mm) by 48 inches (1220 mm), nominal.

- .3 R-Value (LTTR):
  - .1 2 layers of 4 inch (104 mm), and 1 layer of 1 inch (25.4mm); R-value: 50, minimum.
  - .4 Compressive Strength: 20 psi (140 kPa) when tested in accordance with ASTM C 1289.
  - .5 Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents.
  - .6 Recycled Content: 19 percent post-consumer and 15 percent post-industrial, average.
  - .7 Acceptable Product: RESISTA polyisocyanurate Insulation by Firestone, or approved alternate.
- .2 Cover Board-High density polyisocyanurate board: Do not torch High density polyisocyanurate board, apply an asphalt-impregnated board. For torching, all the seams must be taped. Closed cell polyisocyanurate foam with coated glass mat facer laminated to both faces, with the following additional characteristics:
  - .1 Thickness: 0.5 inches (12 mm).
  - .2 Size: 48 inches (1220 mm) by 48 inches (1220 mm), nominal.
  - .3 R-Value (LTTR):
    - .4 0.5 inches (12 mm), R-Value: 2.5, minimum.
    - .5 Compressive Strength: 120 psi (827 kPa) when tested in accordance with CAN/ULC-S704.
    - .6 Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents.
    - .7 Recycled Content: 8.3 percent post-industrial, average.
    - .8 Acceptable Product: ISOGard HD by Firestone, or approved alternate.
- .3 Adhesive for Insulation Attachment: Type as required by roof membrane manufacturer for roofing system and warranty to be provided; use only adhesives furnished by roof membrane manufacturer. ISO Twin Pack Adhesive by Firestone, or approved alternate.

## **2.6 VAPOUR RETARDER MATERIALS**

- .1 Peel and stick membrane are required at transitions: to connect the roof membrane to the wall surface and lap onto the spray foam insulation. Refer to drawings.
- .2 Self-Adhered: Self-adhesive SBS modified bitumen adhesive on the bottom surface and a tri-laminated polyethylene on the top surface. V-Force by Firestone, or approved alternate.
- .3 Vapour Retarder under base layer of insulation:

- .1 One Layer: Self-adhesive SBS modified bitumen adhesive on the bottom surface and a tri-laminated polyethylene on the top surface. V-Force by Firestone, or approved alternate.
- .4 Method of Application, design based on V-Force by Firestone:
  - .1 Apply at ambient temperatures as per manufacturer's recommendation: -4 °C as long as it has been stored in a heated area so that it will be between 10 °C and 38 °C at the time of application.
  - .2 All substrates except metal decks must be primed with either Firestone SA Water Based Primer (W563587091) or Firestone SA Solvent Based Primer (W563587090), or approved alternate.
  - .3 Vapour Retarder membrane must be installed with minimum 3" (76.2 mm) side laps and 6" (152.4 mm) end laps.
  - .4 Vapour Retarder membrane should be rolled in with a 75 lb (34 kg) roller to fully mate each roll to substrate, including all lap areas.
  - .5 Follow method of application according to manufacturer's recommendation.
- .5 Storage:
  - .1 All material should be stored out of the weather in a clean, dry area in its original unopened packaging at a minimum of 10°C and a maximum of 60°C so that it will be 10 °C or above at the time of application.
  - .2 Do not stack Vapor Barrier membrane more than two (2) pallets high.
  - .3 If the material must be stored temporarily on the roof before application, it must be elevated from the roof surface on a pallet, stored on end, and covered from the weather with a light colored opaque tarp in a neat, safe manner that does not exceed the allowable load limit of the storage area.

## **2.7 METAL ACCESSORIES**

- .1 Parapet Copings: Formed metal coping with galvanized steel anchor/support cleats for capping any parapet wall; watertight, mechanically fastened as indicated on drawings. Firestone Coping system by Firestone, or approved alternate.
  - .1 Material and Finish: 24 gage, 0.024 inch (0.06 mm) thick galvanized steel with Kynar 500 finish in manufacturer's standard color; factory-installed protective plastic film.
  - .2 Fasteners: Electrolytically compatible; minimum pull out resistance of 240 pounds (109 kg) for actual substrate used; no exposed fasteners.

## **2.8 ACCESSORY MATERIALS**

- .1 Wood Nailers: Construction grade, S4S, meeting the requirements of CSA 0141
  - .1 Width: 3-1/2 inches (90 mm), nominal minimum, or as wide as the nailing flange of the roof accessory to be attached to it.
  - .2 Thickness: Same as thickness of roof insulation.

## **3. EXECUTION**

### **3.1 GENERAL**

1. Do work in accordance with Canadian Roofing Contractors Association Roofing Specifications Manual (CRCA) and Manufacturer's requirements except as specified within Contract Documents and to approval of Consultant.
2. More stringent requirements shall govern.
3. Prepare surfaces to be waterproofed in strict accordance with manufacturer(s)' requirements and as follows:
  - .1 Add new vapour barrier, polyisocyanurate insulation, 2 ply SBS modified bitumen, flashings and overburden materials. Maintain the existing roof deck and below.
4. When using adhesive to glue insulation to the existing modified bitumen membrane, surface must be cleaned and then prime as per manufacturer's requirements.
5. For torching, all the seams must be taped.
6. Install roofing, insulation, flashings, and accessories in accordance with roofing manufacturer's published instructions and recommendations for the specified roofing system. Where manufacturer provides no instructions or recommendations, follow good roofing practices and industry standards. Comply with national, provincial, and local regulations.
7. Obtain all relevant instructions and maintain copies at project site for duration of installation period.
8. Do not start work until Pre-Installation Notice has been submitted to manufacturer as notification that this project requires a manufacturer's warranty.
9. Examine surfaces to receive membrane to ensure that they are smooth, dry, sloping and free from conditions that will adversely affect execution, permanence, adhesion or quality of work. Do not proceed with work until substrate and conditions for work are acceptable.
10. Examine surfaces and repair damaged, deteriorated or unsuitable sheathing areas prior to commencement of work

11. Replace cut out portions of sheathing boards with boards of equal sectional dimensions, and specified grade. Seat each end of board on rafter, with 25mm bearing, and secured to rafter.
12. Re-secure loose sheathing and/or blocking. Restore sheathing to a sound and even condition. Replace damaged, warped and deteriorated sheathing or blocking members. Obtain smooth, even and suitable deck surface.
13. Sweep decks clean of debris and standing water, and blow clean using an air compressor to remove any remaining loose debris.
14. Prepare upturns, corners, surface protrusions and other areas in accordance with waterproofing membrane manufacturer's recommendations.
15. Scrub clean oil contaminated surfaces with tri-sodium phosphate and thoroughly rinse clean and dry.
16. Surfaces shall be clean and dry prior to application of coating materials.
17. Apply membrane after other work that penetrates membrane has been completed.
18. Perform work using competent and properly equipped personnel.
19. Temporary closures, which ensure that moisture does not damage any completed section of the new roofing system, are the responsibility of the applicator. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition.
20. Install roofing membrane only when surfaces are clean, dry, smooth and free of snow or ice; do not apply roofing membrane during inclement weather or when ambient conditions will not allow proper application; consult manufacturer for recommended procedures during cold weather.
21. Protect adjacent construction, property, vehicles, and persons from damage related to roofing work; repair or restore damage caused by roofing work.
  - .1 Protect from spills and overspray from bitumen, adhesives, sealants and coatings.
  - .2 Particularly protect metal, glass, plastic, and painted surfaces from bitumen, adhesives, and sealants within the range of wind-borne overspray.
  - .3 Protect finished areas of the roofing system from roofing related work traffic and traffic by other trades.
22. Until ready for use, keep materials in their original containers as labeled by the manufacturer.

23. Consult membrane manufacturer's instructions, container labels, and Material Safety Data Sheets (MSDS) for specific safety instructions. Keep all adhesives, sealants, primers and cleaning materials away from all sources of ignition.
24. Provide protection to work areas in strict accordance with membrane manufacturer(s)' requirements and as follows:
  - .1 Isolate work areas from all vehicular and pedestrian traffic.
  - .2 Keep flammable materials away from heat, sparks, and flames. Do not allow use of spark producing equipment during application and until vapours are gone. Post "NO SMOKING" signs.
  - .3 Protect plants, vegetation and animals which might be affected by primer or coating overspray.
  - .4 Protect adjacent surfaces from splash and spillage.
  - .5 Protect deck from ingress of water or moisture.
  - .6 Protect freshly applied coating and membrane materials from blowing debris, detrimental weather conditions, persons, or vehicles at least 48 hours after application or until fully cured.
  - .7 Protect the work areas from damage until suitable for vehicular traffic.

### **3.2 EXAMINATION**

1. Examine roof deck to determine that it is sufficiently rigid to support installers and their mechanical equipment and that deflection will not strain or rupture roof components or deform deck.
2. Verify that surfaces and site conditions are ready to receive work. Correct defects in the substrate before commencing with roofing work.
3. Examine roof substrate to verify that it is properly sloped to drains.
4. Verify that the specifications and drawing details are workable and not in conflict with the roofing manufacturer's recommendations and instructions; start of work constitutes acceptable of project conditions and requirements.
5. Clean adhesives with solvent and allow vapours to dissipate prior to membrane application.
6. Before commencement of Work, verify acceptability of existing site conditions with manufacturer(s)' representative with respect to condition of substrate; and that the execution, performance and quality of work will not be adversely affected by any existing conditions.

7. Arrange a physical, positive adhesion test to the existing roof by the manufacturer's to confirm that the adhesive has adequate bond to the existing surface. Submit report to the Consultant.

### **3.3 PREPARATION**

1. Take appropriate measures to ensure that fumes from adhesive solvents are not drawn into the building through air intakes.
2. Prior to proceeding, prepare roof surface so that it is clean, dry, and smooth, and free of sharp edges, fins, roughened surfaces, loose or foreign materials, oil, grease and other materials that may damage the membrane.
3. Fill all surface voids in the immediate substrate that are greater than 1/4 inch (6 mm) wide with fill material acceptable insulation to membrane manufacturer.
4. Seal, grout, or tape deck joints, where needed, to prevent bitumen seepage into building.
5. Prior to commencing the work, Contractor is required to sweep and blow all possible loose granule from the surface. Power washing is also acceptable but the membrane surface must be completely dry prior to application of the new insulation.

### **3.4 INSTALLATION**

1. Install all new components in strict conformance with manufacturer's instructions.
2. Install waterproofing components on clean and dry surfaces, in strict conformance with SBS manufacturer's recommendations.
3. Waterproofing work must be completed in a continuous fashion as surfaces are readied and weather conditions permit.
4. Whenever SBS membranes are torch applied, a continuous and even 13 mm (1/2 in.) bead of molten bitumen (bleed out) must be visible as the side and end laps of the membrane. During installation, avoid overheating the SBS membrane and creating excessive bitumen bleed-out at joints and or degranulation of cap sheet surfaces.
5. Ensure watertight condition of roof at all times, including protection during installation work by other trades and progressive protection work as work is completed.
6. Complete all work (temporary supports for equipment and bases, disconnection and connection of equipment as needed, moving and lifting of bases, etc.) required for waterproofing beneath equipment and bases; use qualified trade persons as required. Temporary supports for waterproofing beneath air-conditioning units must be designed to hold supported loads and distribute these loads to avoid structural damage.



7. Replace existing caulking with new materials along all joints and where directed by Consultant.
8. Protect finished work to avoid damage during roofing installation and material transportation. Assume full responsibility for any damage.

### **3.5 INSULATION & COVER BOARD INSTALLATION**

1. Install insulation in configuration and with attachment method(s) specified in PART 2, under Roofing System.
2. Install insulation in a manner that will not compromise the original roof membrane watertightness.
3. Do not torch High density polyisocyanurate board, apply an asphalt-impregnated board. For torching, all the seams must be taped.
4. Install only as much insulation as can be covered with the completed roofing system before the end of the day's work or before the onset of inclement weather.
5. Lay roof insulation in courses parallel to roof edges.
6. Neatly and tightly fit insulation to all penetrations, projections, and nailers, with gaps not greater than 1/4 inch (6 mm). Fill gaps greater than 1/4 inch (6 mm) with acceptable insulation. Do not leave the roofing membrane unsupported over a space greater than 1/4 inch (6 mm).
7. Insulation and cover board adhesive attachment: Apply in accordance with membrane manufacturer's instructions and recommendations; "walk-in" individual roof insulation boards to obtain maximum adhesive contact.
8. Install thermal barrier, to CSA A123.21 requirement, submit fastening pattern as per manufacturer's approved design.

### **3.6 BASE INSULATION**

1. Adhesive: Soprema Duotak, or approved alternate.
2. Base insulation shall be reduced 13 mm (1/2 in.) for 1220 mm (4 ft.) centred at drain. Transition shall be 'shaved' to provide a smooth surface for tapered or overlay insulation.
3. Neatly trim all joints with appropriate blade, knife or saw. Damaged boards shall be replaced at discretion of Consultant.
4. Install insulation panels with tightly butted joints and end joints staggered between adjacent panels and between lower and upper rows 610 mm (24 in.).

5. Gaps/voids in insulation and adjacent substrates greater than 3mm (1/8 in.) shall be filled in with similar material or spray foam insulation.
6. Do not lay more insulation/board than can be covered with roof membrane on same day. Insulation, which is damaged by moisture, shall be marked and promptly removed from site.

### **3.7 TAPERED INSULATION**

1. Tapered insulation: Firestone ISO 95+ GL, or approved alternate.
2. Tapered insulation shall be applied over top layer of base insulation and under overlay board in accordance with reviewed shop drawings.
3. Tapered sump shall be installed in its entirety the same day. Under no circumstance shall sump be installed in more than one application as to build-in a high point within sump area.
4. Install insulation ensuring panels are tightly butted and walk insulation into hot asphalt to achieve solid bond, immediately after placement.
5. Do not lay more insulation/board than can be covered with roof membrane base sheet on same day.
6. Neatly trim all joints with appropriate blade, knife or saw. Insulation, which is damaged by moisture, shall be marked and promptly removed from site.

### **3.8 OVERLAY BOARD**

1. Stagger end joints to adjacent boards and to underlying insulation board joints. Install insulation ensuring panels are tightly butted and walk insulation into hot asphalt to achieve solid bond, immediately after placement.
2. Do not lay more boards than can be covered with roof membrane on same day. Boards that are damaged shall be marked and promptly removed from site.
3. Adhesive: Soprema Duotak, or approved alternate.

### **3.9 ROOF MEMBRANE BASE SHEET**

1. Do not use materials that have defects or are damaged.
2. Unroll modified membrane base sheet and allow sheets to relax minimum 15 minutes (or more if required by manufacturer) and burn plastic film in zigzag fashion as per manufacturer's requirements and approval of Consultant.

3. Align and apply base sheet with laps centred over drain area and working upslope with laps to shed water. Position membrane with minimum 75 mm (3 in.) side laps and 150 mm (6 in.) end laps. Cut-off corners at end laps to be covered by next roll. Stagger end joins in sheets minimum 350 mm (12 in.).
4. Thoroughly and effectively roll membrane application to ensure full contact and adhesion. Do not step or walk on membrane during or immediately after application until it set.
5. Adhesive: Soprema Duotak, or approved alternate.
6. Exterior 25 mm (1 in.) edge of all laps shall be left dry and 'torched' to provide 13 mm (1/8 in.) 'bitumen bleed-out' at all side and end laps.
7. Apply membrane base sheet without voids, wrinkles, buckles, fishmouths or any evidence of a lack of full adhesion. Deficiencies must be repaired to satisfaction of Consultant.

### **3.10 SBS MEMBRANE INSTALLATION**

1. Base sheet application shall be reviewed by manufacturer and Consultant prior to proceeding with membrane cap sheet.
2. Apply primer to curbs, wall, wood, metal, and membrane flashings. Minimum application rate: 0.25 litres/m<sup>2</sup>, with roller or spray. Allow primer to cure prior to membrane flashing application. Do not allow primer to puddle.
3. Prevent primer from entering building interior through openings and joints in metal decks, by installing self-adhesive membrane at roof perimeters, walls, curbs and other roof openings.
4. Allow primer to cure prior to application of new roofing membrane or membrane flashings as detailed. Do not accelerate drying time by use of flame.
5. Self-adhesive membrane must be applied same day as primer.
6. Install base sheet flashings in maximum one (1) metre wide strips to cover roofing substrate over 100 mm. Extend base sheet a minimum of 125mm (5 in.) beyond vertical transition onto field of roof. Overlap side laps by 75 mm and 150 mm end laps. Stagger side laps by at least 100 mm from base sheet overlaps on roof to avoid excessive layering.
7. Apply membrane flashings in general conformance with details commencing from low point and working up-slope and staggered 50% from base sheet laps. Place membrane without stretching over substrate and allow to relax at least 30 minutes before attachment or splicing; in colder weather allow for longer relax time.
8. Lay out the membrane pieces so that field and flashing splices are installed to shed water.

9. Install membrane without wrinkles and without gaps or fishmouths in seams, air pockets, wrinkles, buckles, and other evidence of a lack of full adhesion; bond and test seams and laps in accordance with membrane manufacturer's instructions and details. Repair deficiencies to satisfaction of Consultant.
10. Edge Securement: Secure membrane at all locations where membrane terminates or goes through an angle change greater than 2 in 12 inches (1:6 ) using mechanically fastened reinforced perimeter fastening strips, plates, or metal edging as indicated or as recommended by roofing manufacturer.
  1. Exceptions: Round pipe penetrations less than 18 inches (460 mm) in diameter and square penetrations less than 4 inches (200 mm) square.
  2. Metal edging is not merely decorative; ensure anchorage of membrane as intended by roofing manufacturer.
11. At all interior and exterior corners, apply a minimum 150 mm (6 in.) gusset to fill in voids. Cut, mitre and weld corners.
12. 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.
13. Install self-adhesive membrane base sheet flashings in full contact onto primed substrate. Roll into place ensuring positive bond has been achieved.
14. Extend base sheet flashing over the roofing membrane beyond the toe of cant a minimum of 150 mm (6 in.).
15. Extend modified bituminous base sheet flashing over parapets, roof edges and down the outside face of walls as detailed. Secure membrane flashing with large head galvanized nails at 150 mm (6 in.) on centre. At walls: extend flashing a minimum of 305mm (12in.) up vertical wall with new reglet, termination bar and sealant.
16. Extend modified bituminous base sheet flashing over parapet, perimeter, eaves and down outside face of walls 38 mm (1 ½ in.) onto lower substrate.
17. Repair defects in applications with additional piece of self-adhesive base sheet. Carry out repairs to satisfaction of Consultant.
18. Maintain minimum 50% stagger from membrane base sheet at side laps. Use chalklines to maintain neat and straight lines. Do not walk on or step into newly applied membrane.

19. Apply loose granules in areas where excess heat welding has occurred. Apply heat place granules and embed them into warm membrane, place granules and embed them into warm membrane.
20. At wall and curbs, provide mechanical fasteners within laps of base sheet flashing, prior to applying succeeding sheet. Fasteners shall be installed at maximum 100 mm (4 in.) on centre commencing from 150 mm (6 in.) above roof membrane.
21. Apply self-adhesive base sheet flashing into primed surfaces and roll into place with adequate pressure to ensure full contact and adhesion with substrate. Membrane must be rolled into place using manufacturer's approved roller.
22. Peel back 100 to 150 mm (4 to 6 in.) of the silicone release paper to hold the membrane in place. Gradually peel back remaining silicone release paper, pressing down on membrane with an aluminum applicator to ensure good contact and adhesion.
23. Heat weld exterior 25 mm (1 in.) of all side and end laps providing a 3 mm (.8 in.) bitumen bleed out. Thoroughly and effectively roll membrane (using manufacturer's recommended steel roller) to attain full contact and adhesion.
24. Build new parapet with new height as per detail drawings, appropriately secured to resist overturning.

### **3.11 REINFORCEMENT GUSSETS**

1. Apply gussets at every angle, on inside and outside corners in accordance with manufacturer's requirements.
2. Apply thermofusible gussets over base sheet flashings and before application of membrane cap sheet flashing.

### **3.12 MODIFIED BITUMEN INSTALLATION**

1. Self-Adhered base sheet: BaseGard SA, or approved alternate.
2. Adhesive: Soprema Duotak, or approved alternate.
3. Cap sheet: SBS Premium White
4. Start at the low point with a full width sheet, fully unrolled and aligned; align and unroll remaining sheets during heat fusing operation.
5. Maintain 3 inch (75 mm) side laps and 6 inch (150 mm) end laps.
6. Granule Surfaced Sheets: In areas that form the substrate for heat fusing, such as laps, flashings, and patches, embed the granules prior to fusing subsequent sheet. Apply

additional granules to all exposed surfaces that have none or cover with additional piece of granule surfaced material.

7. Cap sheet must be heat welded over base sheet on the same day. Complete the entire membrane installation without undue delay.
8. Phased construction is not acceptable.
9. Complete new roof system, including vapour retarder, insulations and membrane and membrane flashings to each day's termination point and install temporary water cut-off. Remove water cut-off when work resumes.
10. Prior to commencing with insulation applications, ensure vapour retarder has been repaired and is clean and dry.

### **3.13 ROOF MEMBRANE CAP SHEET FLASHINGS**

1. Once base sheet is applied and no defects are apparent, proceed with installation of cap sheet. Install cap sheet, beginning at the drains and perpendicular to the slope.
2. Apply membrane cap sheet flashings in general conformance with details commencing from low point and working up-slope using 'torching method' to attain full bond to base sheet flashing and membrane cap sheet.
3. Membrane base sheets with a poly on top face shall have poly burned off prior to applying cap sheet flashings.
4. Maintain minimum 50% stagger from base sheet. Use chalk lines to maintain neat and straight lines. Do not walk on or step into newly applied membrane.
5. Apply cap sheet flashing in maximum 1 m (3.25 ft.) wide strips. Extend base sheet a minimum of 50 mm (2 in.) beyond base sheet flashing onto field of roof.
6. Terminate cap sheet 13 mm (1/2 in.) back from outside edge of parapet blocking and 50 mm (2 in) past base sheet flashing onto field of roof.
7. Provide 13 mm (1/8 in.) bleed out at all side laps. Maintain minimum 75 mm (3 in.) side and 150 mm (6 in.) end laps.
8. At wall terminations, install and secure termination bar to adequately restrain the flashings. Secure termination bar at maximum 305 mm (12 in.) on centre. Apply sealant bead along entire length of termination bar.
9. Repair defects in applications with additional piece of torch grade base sheet. Carry out repairs to satisfaction of Consultant.

### 3.14 FLASHING AND ACCESSORIES INSTALLATION

1. Install flashings, including laps, splices, joints, bonding, adhesion, and attachment, as required by membrane manufacturer's recommendations and details.
2. Metal accessories: Install metal edgings, gravel stops, and copings in locations indicated on the drawings, with horizontal leg of edge member over membrane and flashing over metal onto membrane.
  1. Follow roofing manufacturer's instructions.
  2. Remove protective plastic surface film immediately before installation.
  3. Install water block sealant under the membrane anchorage leg.
  4. Flash with manufacturer's recommended flashing sheet unless otherwise indicated.
  5. Where single application of flashing will not completely cover the metal flange, install additional piece of flashing to cover the metal edge.
  6. If the roof edge includes a gravel stop and sealant is not applied between the laps in the metal edging, install an additional piece of self-adhesive flashing membrane over the metal lap to the top of the gravel stop; apply seam edge treatment at the intersections of the two flashing sections.
3. Complete flashing work using specified materials as indicated and in accordance with the requirements of Section 07 62 00.
4. Unless otherwise specified, nails, staples, screws, bolts, washers and all other metal fasteners, will be made of compatible and rustproof metals, of same colour as surfaces with which they are in contact.
5. Shaping:
  1. Take special care when shaping sheet metal with a permanent finish.
  2. Bend sheet metal using sheet metal break. When possible, use bench and appropriate tools for all shaping, bending and welding work.
  3. Fold back all exposed edges by 12 mm to hide and strengthen edges.
  4. All corners, fasteners, angles and joint covers must be of same metal, gauge and finish as metal being shaped.
6. Installation:
  1. All sheet metal work must conform to details, with plumb profiles exempt of all deformities or defects which may hinder appearance.
  2. Space angles and fasteners (seams) to allow for normal expansion and contraction.
  3. No nail or screw can be apparent. All metalwork must be fastened and all corners and angles must be perfectly aligned.

4. Caulk all sheet metal joints and all junctions with other materials.
5. At junctions between roof surface and masonry surfaces, scrape out joints to a 25-mm depth, insert flashing, fasten and seal with specified sealer.
6. Install appropriate flashing, cap sheet, counter flashing, casings and other accessories to vents, pipes and other ducts to ensure perfect sealing
7. Roofing Expansion Joints: Install as shown on drawings and as recommended by roofing manufacturer.
  1. At all roof dividers, movement and control joints, construct as detailed with new framing and sheathing.
  2. At tie-ins with existing and adjacent roof areas, extend new membrane flashings to cross-over and terminate at high point.
8. Flashing at Walls, Curbs, and Other Vertical and Sloped Surfaces: Install weather tight flashing at all walls, curbs, parapets, curbs, skylights, and other vertical and sloped surfaces that the roofing membrane abuts to; extend flashing at least 8 inches (200 mm) high above membrane surface.
  1. Use the longest practical flashing pieces.
  2. Evaluate the substrate and overlay and adjust installation procedure in accordance with membrane manufacturer's recommendations.
  3. Complete the splice between flashing and the main roof sheet with specified splice adhesive before adhering flashing to the vertical surface.
  4. Provide termination directly to the vertical substrate as shown on roof drawings.
  5. At all parapets, perimeters, walls, sleepers and curbs, construct with new framing and sheathing as detailed.
  6. Provide 2-ply membrane flashings at all noted locations in accordance with this section.
  7. Provide metal cap flashings at sleepers and curbs prior to installing units.
  8. Install wood or fibre cants as required at all horizontal-to-vertical junctions and/or as indicated. Install framing and blocking after preservative treatment of cut ends. Anchor cants and blocking securely.
  9. Cut cant strips, trim or blocking as required to accommodate cambers and falls in roof structure and to receive flashing and applied roofing materials.
  10. Adjust height of all cants, blocking, curbs, drains, etc., where required to suit thickness of new roofing system.
  11. Apply hot bitumen to receiving surface and embed cant firmly by hand.



12. Angle cut cants to fit tightly on back and bottom where roof to wall angle varies from 90°.

9. Storm Collars:

1. Install storm collars complete with clamping ring and sealant over stacks where caps cannot be installed.

10. Roof Drains:

1. Taper insulation around drain to provide smooth transition from roof surface to drain. Use specified pre-manufactured tapered insulation with facer or suitable bonding surface to achieve slope; slope not to exceed manufacturer's recommendations.
2. Position membrane, then cut a hole for roof drain to allow 1/2 to 3/4 inch (12 to 19 mm) of membrane to extend inside clamping ring past drain bolts.
3. Flash in drain flange with one ply of torch grade base sheet. Extend membrane a minimum of 305 mm (12 in.) beyond the edge of drain flange.
4. Make round holes in membrane to align with clamping bolts; do not cut membrane back to bolt holes. Apply mastic on underside of flange.
5. Apply sealant on top of drain bowl where clamping ring seats below the membrane. Install roof drain clamping ring and clamping bolts; tighten clamping bolts to achieve constant compression. Cut opening through membrane and insulation and centre drain over pipe. Insert drain body into roof system until flange is flush with roof membrane. Secure new drains with mechanical (MJ) connection and under deck clamp.  
Note: Overlay board to be completely cut-out under drain flange.
6. Install clamping ring and aluminum strainer over raised bosses and install screws to tighten ring against membrane and flashings until secure and apply gravel.
7. Ensure roof drains are clear of debris and free draining at project completion.

11. Overflow and Functional Scuppers:

1. Where indicated on drawings, install new scuppers and secure to substrate.
2. Install scupper, plumb, level and true-to-line. Secure flanges to outer edges at a minimum of four (4) locations.
3. Set and cover scupper flanges with mastic prior to roofing.
4. Flash scuppers with 1-ply modified bitumen base sheet adhered in place. Extend base sheet 125mm (5.0 in.) beyond scupper flange.
5. Provide new rain water leaders as required.

6. All pipes shall be installed true-to-line and secured to the wall at a minimum of three (3) locations using heavy duty metal 2-hole clamps. Provide lead anchors for screws when fixing to masonry surfaces.

12. Flashing at Penetrations: Flash all penetrations passing through the membrane; make flashing seals directly to the penetration.

1. Pipes, Round Supports, and Similar Items: Flash with specified pre-molded pipe flashings wherever practical; otherwise use specified self-curing elastomeric flashing.
2. Pipe Clusters and Unusual Shaped Penetrations: Provide penetration pocket at least 2 inches (50 mm) deep, with at least 1 inch (25 mm) clearance from penetration, sloped to shed water.
3. High Temperature Surfaces: Where the in-service temperature is, or is expected to be, in excess of 180 degrees F (82 degrees C), protect the elastomeric components from direct contact with the hot surfaces using an intermediate insulated sleeve as flashing substrate as recommended by membrane manufacturer.
4. Electrical and Gas Line Penetrations: at pipe/conduit penetrations, provide prefabricated pitch-pan system, adhesive and mastic.
5. Adhere inter-clip system to roof membrane, seal all joints and fill pitch-pan with required pourable sealer with high mid-point and sloped to exterior and apply granules

13. Sleeves

1. Provide all required vent, stack and conduit sleeves and supports to suit site conditions.
2. Install penetration sleeve flashings in strict accordance with manufacturer's instructions.
3. At vent pipes, extend pipe minimum 75 mm (3 in.) above top edge of sleeve. At exhaust stacks, stack shall allow for rain collar installation.
4. Prime stack flanges, top and bottom and set underside of flange in bed of mastic on membrane and position evenly around projection.
5. Apply primer coating on underside of sleeve flange and embed deck flange in a layer of mastic.
6. Alternate: Flash in flanges with one ply of torch grade base sheet. Extend membrane a minimum of 305 mm (12 in.) beyond the edge of drain flange. Allow gap between sleeve and hot exhaust stacks.

### **3.15 PITCH BOX FILLER**

1. Make sure substrate is clear of loose granules and all foreign substances that can impair adhesion.
2. Place prefabricated curbs in the desired location and mark the outside edge for reference. Place curbs at least 25 mm (1 inch) away from the penetration.
3. Wire brush area around penetration to remove loose materials and contaminants.
4. Seal base of penetration with specified sealant to prevent the mastic from flowing through openings.
5. Apply a bead of sealant to the substrate where curbs will be placed and to the locking joint of the curb.
6. Set the curbs in place and apply equal pressure to assure positive contact with roof membrane. Strike away excess sealant.
7. Where required, apply pitch pocket filler in maximum 100 mm (4 in.) depths with top sloped to drain moisture.
8. Pitch pocket with depths higher than 100 mm (4 in.) are to be filled with spray polyurethane foam to reduce depth of Pitch Pocket Filler.

### **3.16 FINISHING AND WALKWAY INSTALLATION**

1. Install cap sheet ply as walkways at access points to the roof, around rooftop equipment that may require maintenance, and where indicated on the drawings.

### **3.17 FIELD QUALITY CONTROL**

1. Inspection by Manufacturer: Provide final inspection of the roofing system by a Technical Representative with current RRO employed by roofing system manufacturer specifically to inspect installation for warranty purposes (i.e. not a sales person).
2. Perform all corrections necessary for issuance of warranty.

### **3.18 CLEANING**

1. Clean all contaminants generated by roofing work from building and surrounding areas, including bitumen, adhesives, sealants, and coatings.
2. Repair or replace building components and finished surfaces damaged or defaced due to the work of this section; comply with recommendations of manufacturers of components and surfaces.

3. Remove leftover materials, trash, debris, equipment from project site and surrounding areas as work proceeds and on completion, or sooner if requested by Consultant.
4. Remove all stains, asphalt, caulking or other adhesive from all surfaces.

### **3.19 PROTECTION**

1. Where construction traffic must continue over finished roof membrane, provide durable protection and replace or repair damaged roofing to original condition.
2. Protect work of this section from damage. Damaged work which cannot be satisfactorily repaired, restored or cleaned shall be replaced at no cost to Owner.
3. Protect work of other sections from damage while performing roofing work. Provide tarpaulins and other coverings, as required, to protect lower and adjacent walls, finishes and surfaces. Additional protection shall be provided if instructed by Consultant.
4. Prevent bitumen, precipitation and debris entering openings and drains during work.
5. Protect finished roof surfaces with minimum 13 mm (1/2 in.) plywood sheathing with 25 mm (1 in.) polystyrene insulation board on underside.
6. Damaged areas and surfaces shall be repaired to satisfaction of Consultant at no additional cost to Owner.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

1. All work of this Section to conform to the appropriate requirements of the most recent edition of the Ontario Building Code.
2. Coordinate work of this Section, and with other related Sections, to ensure satisfactory and expeditious completion of the Work.
3. Review and update all work schedules with Consultant on a regular basis.
4. Examine the Work of this, and all related, Sections to confirm the extent, location, quality, and condition prior to commencing.
5. Discontinue work during severe rain, wind, heat, cold, or other such inclement weather and monitor time lost in relation to Environment Canada daily norms. Lost time will only be considered where actual conditions exceed norms.

### **1.2 RELATED SECTIONS**

- .1 Section 02 06 00: Selective Demolition
- .2 Section 04 20 00: Unit Masonry
- .3 Section 05 41 00: Structural Steel Stud Framing System
- .4 Section 05 50 00: Metal Fabrications
- .5 Section 06 10 00: Carpentry
- .6 Section 07 20 00: Insulation
- .7 Section 07 21 19: Spray-in-place Urethane Foam Insulation
- .8 Section 07 27 00: Air / Vapour Barrier
- .9 Section 07 42 00: Wall Panels
- .10 Section 07 46 19: Steel Siding
- .11 Section 07 48 13: Thermally Broken Rain Screen Attachment System
- .12 Section 07 52 00: Membrane Roofing - SBS
- .13 Section 07 90 00: Joint Sealants.
- .14 Section 08 17 13: Entry Doors and Frames.
- .15 Section 08 42 00: Fibreglass Window
- .16 Section 09 25 00: Gypsum Wallboard
- .17 Section 09 91 00: Painting

### **1.3 SUMMARY**

1. Furnish all labour, materials, equipment and services necessary to perform the Work of

this Section as specified.

2. Protect and repair as necessary, all materials adjacent to, or affected by this Work.
3. Install new metal flashings, counter flashings, drip flashings, sheet metal materials, and related accessories, as specified and as indicated at windows, doors and curbs.
4. Installation of new metal flashings, metal counter flashings, curb flashings, sheet metal materials, and related accessories at the roofs as indicated and specified herein.
5. Install new metal counter flashings, as indicated and directed, at roof parapet, at top of metal siding, and metal flashing at grade.
6. Install new metal drip flashings at all window heads and sills to accommodate increased thickness of cladding
7. Install new metal drip edges at the underside of window.
8. Install new gutter, eavestrough, rain water leader, and concealed rain water leader.

#### **1.4 SUBMITTALS**

1. Product Data:
  - .1 Submit manufacturer's printed product literature for sheet metal flashing systems materials, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Upon request, submit material safety data sheets.
2. Submittals:
  - .1 Submit shop drawings in accordance with Division 1 sections.
  - .2 Samples: Submit duplicate 50 x 50 mm samples of each type of sheet metal material, finishes and colours, to Consultant for approval.
  - .3 Upon request, submit certified copy of test data from recognized independent testing laboratory confirming performance requirements of insulation materials as specified herein.
  - .4 Before work commences, verify in writing that materials submitted and approved are mutually compatible and are compatible with existing materials. Support verification with manufacturer(s) data and/or certification.
  - .5 If a material submitted and approved is not suitable for verification and/or certification, submit alternate material for verification and certification for review by Consultant and approval by Owner.
  - .6 Upon request, submit Material Safety Data Sheets.

## 1.5 SCHEDULE

- .1 The installer shall allow for co-ordination between trades and shall strictly comply with the installation dates scheduled in this specification.

## 1.6 REFERENCES

- .1 ASTM A653 / A653M-07 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 ASTM A591M-77 - Specification for Steel Sheet, Cold- Rolled, Electrolytic Zinc-Coated.
- .3 ASTM B117-07a - Standard Practice for Operating Salt Spray (Fog) Apparatus
- .4 CGSB 41-GP-6M - Sheets, Thermosetting Polyester Plastics, Glass Fiber Reinforced
- .5 CAN/CSA-S136-M89 - Cold Formed Steel Structural Members CGSB-1-GP-108 - Bituminous Paint
- .6 CRCA - Canadian Roofing Contractors' Association Roofing Specification Manual

## 1.7 QUALITY ASSURANCE

- .1 Perform Work of this Section by competent workers skilled and experienced in using the specified materials.
- .2 Execute Work of this Section under the continuous supervision and direction of a competent person specializing in the type of work specified.
- .3 Independent Inspection and Testing:
  - .1 Owner may retain an independent Consultant to carry out periodic supervision during construction. If requested by Consultant, contractor to take cut-test samples of assembly, identify locations and submit to Consultant for review and testing.
  - .2 Employment of Inspection and Testing agencies does not relieve the Contractor's responsibility to perform work in accordance with the Contract Documents.
  - .3 Provide assistance required for executing Inspection and Testing by the appointed agencies and/or the Consultant.
  - .4 Allow Inspection and Testing agencies and/or the Consultant access to the work.
  - .5 If required by the Inspection and Testing agency or by the Consultant, provide cuts for testing. Repair cuts without cost to the Owner.
  - .6 Contractor shall make an allowance for minimum one cut test per day and all required patching to match existing assembly.
  - .7 Failed test results will require remedial work acceptable to Consultant and may entail complete removal and replacement of failed areas.

- .8 Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

### **1.8 JOB MOCK-UP**

- .1 Prepare one (1) full size mock-up of each metal drip flashing for the Consultant's and Owner's review, promptly and in an orderly sequence, to avoid delay in the schedule of the Work.
- .2 Mock-up to include all typical components, specified colour(s) and typical terminations of system.
- .3 Locate mock-up at location selected by Consultant and/or Owner.
- .4 Build mock-up using personnel assigned to the Work, with products and techniques representing all phases of the work.
- .5 Mock-up sample to demonstrate the materials, procedures, sequences, finishes, and general quality of the Work, and shall serve as the standard for the remaining parts of the Work.
- .6 Mock-up to include metal drip flashings, trim and all related accessories, at a location acceptable to the Consultant and Owner.
- .7 Verify aesthetics, workmanship, preparation and installation procedures with Consultant.
- .8 Mock-up sample may be incorporated into the Work with the exception of the prefinished metal trim members.
- .9 Obtain Consultant's review and written comment prior to commencement of the Work. Approved samples will be standard for comparison and may be incorporated into the Work

### **1.9 PRODUCT DELIVERY, STORAGE AND HANDLING**

- 1. Deliver all materials in original, unopened packaging with the manufacturer's labels intact.
- 2. Ensure that all Material Safety Data Sheets and Labels, required by the Workplace Hazardous Materials Information System (WHMIS) Regulation, are in plain view and/or readily obtained.
- 3. Store all materials at temperatures that will not adversely affect their performance characteristics.
- 4. Store all materials in such a manner so as to protect them from precipitation, ground



moisture, temperature extremes, sunlight and construction activities by use of weatherproof coverings and raised platforms. Interior storage shall be employed when and where necessary, with the express written consent of the Owner.

5. Should storage on site become necessary, follow manufacturer's storage recommendations.
6. Obtain Owner's approval of the location and extent of all on-site storage areas.
7. Protect materials from freezing. Materials suspected of having been subjected to freezing are not to be used unless the manufacturer verifies, in writing, that the material has not been damaged.
8. Store materials away from open flame or ignition sources.
9. Do not transport any materials through the building.
10. Follow precautionary statements on product labels for storage and handling before use and make reference to applicable Material Safety Data Sheets.
11. Do not double stack pallets of materials.
12. Replace incorrectly stored materials at no cost to the Owner.
13. Handle all materials in a careful manner ensuring that no unsightly conditions or otherwise damaged material is incorporated into the Work.
14. Remove only in quantities required for same day use.
15. Protect metal during handling and storage to prevent rusting, staining, abrasion of finish coatings, bending and denting.
16. Take all necessary precautions to protect prefinished metal surfaces against scratching.

#### **1.10 JOB SITE CONDITIONS**

- .1 Prior to installation, inspect all surfaces to which the work of this Section is to be applied, and report in writing to the Consultant any unsatisfactory conditions that would adversely affect the work.
- .2 Do not apply work during rain, fog or snow. Do not work over damp, frozen or unsuitable surfaces.
- .3 Commencement of work shall imply unconditional acceptance of all surfaces.

#### **1.11 WARRANTY**

- .1 Guarantee work of this Section against all defects and deficiencies in materials and workmanship for a three (3) year period from the date of Substantial Performance of the Work.

- .2 Submit each Warranty:
  - .1 Identifying the party as warrantor/guarantor.
  - .2 Issued in both the Contractor's and Owner's names.
  - .3 Including labor and materials necessary to remove, replace, and/or repair the defective products originally provided as part of the Work and any adjacent damaged materials.
- .3 Promptly notify, respond to, and correct, at no expense to the Owner, any defects or deficiencies that are reported or become apparent within the warranty period.
- .4 Notify the Owner and Consultant, in writing, of the schedule and particulars related to the execution of any warranty work.

## **2. PRODUCTS**

### **2.1 MATERIALS**

- .1 METAL FLASHINGS: 22 Ga. thickness or as otherwise shown, commercial quality, prefinished metal as approved, to closely match adjacent metal work or as indicated. Coordinate with Section 07 46 19. Apply 8000+ Series coating on surfaces exposed to view. Colour and gloss will be selected by Owner from manufacturer's standard range.
- .2 METAL FLASHINGS AT BASE: for locations at base, where there is a frequent exposure to salt: railing post cover, garbage screen post cover, etc. 22 Ga. thickness or as otherwise shown, commercial quality, prefinished galvanized metal as approved, to closely match adjacent metal work or as indicated. Coordinate with Section 07 46 19.
- .3 METAL DRIP FLASHINGS: 24 Ga. thickness or as otherwise shown, commercial quality, prefinished galvanized metal as approved. Apply 8000+ Series coating on surfaces exposed to view. Colour and gloss will be selected by Owner from manufacturer's standard range.
- .4 SPLICE COVERS: Of same material and temper as prefinished sheet steel, minimum 50 mm wide and 22 Ga. minimum thickness.
- .5 CLEATS AND EDGE STRIPS: Of same material and temper as sheet metal, minimum 50 mm wide and 16 Ga. minimum thickness.
- .6 REGLETS AND CAP FLASHINGS: Form recessed reglets and metal cap flashing of 22 Ga. thick sheet metal, commercial quality, prefinished metal as approved, to be built-in concrete and masonry work for base flashings as detailed and in accordance with CRCA requirements. Coordinate with Section 07 46 19. Apply 8000+ Series coating on surfaces exposed to view. Colour and gloss will be selected by Owner from

manufacturer's standard range.

- .1 Provide slotted fixing holes and steel/plastic washer fasteners.
- .7 EAVESTHROUGH: 24 Ga. thickness or as otherwise shown, commercial quality, prefinished metal as approved. Apply 8000+ Series coating on surfaces exposed to view. Colour and gloss will be selected by Owner from manufacturer's standard range. Design is based on VicWest Eavesthrough standard profile, or approved alternate: 76mm deep, 153mm high, connection to suit roof slope.
- .8 SCUPPER ROOF DRAIN: 24 Ga. thickness or as otherwise shown, commercial quality, prefinished metal as approved. Apply 8000+ Series coating on surfaces exposed to view. Colour and gloss will be selected by Owner from manufacturer's standard range. Dimension: 102mmX102mm square.
- .9 RAIN WATER LEADER: 24 Ga. thickness or as otherwise shown, commercial quality, prefinished metal as approved. Apply 8000+ Series coating on surfaces exposed to view. Colour and gloss will be selected by Owner from manufacturer's standard range. Dimension: 76mmX76mm square. Provide attachment to the new cladding as per manufacturer's recommendation. On each rain water leader, provide 610mmX305mm Natural Concrete Splash Pad, Armtec item #2732-203 Model #10000, or approved alternate.
- .10 ALUMINUM COUNTER-FLASHING: well coated, to treat dissimilar materials, colour to match metal flashings.
- .11 ANCHORS: Stainless steel.
- .12 FASTENERS: Stainless steel, head colour same as exterior sheet if exposed. Screw type only.
- .13 SOLVENT: "MEK", Methyl Ethyl Ketone solvent to clean surfaces, or approved similar.
- .14 BITUMINOUS PAINT: Alkali resistant isolation coating, conforming to CGSB 1-GP-108.
- .15 TOUCH-UP PAINT: As recommended by coating manufacturer.
- .16 SEALANTS: As specified in Section 07 90 00.
- .17 MISCELLANEOUS: Provide all appropriate incidental materials required to properly finish the Work specified, as implied by Paragraph 1.2 of this Section.

## 2.2 FABRICATION

- .1 Fabricate metal flashings and other sheet metal work as indicated.
- .2 Brake form pieces in maximum lengths suitable for the Work. Make allowance for expansion at joints. Cut, drill and shape in shop where possible.

- .3 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.
- .4 Hem exposed edges on underside a minimum of 12mm. Miter and seal corners with sealant.
- .5 Hem edges of drip edges a minimum of 20 mm.
- .6 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .7 Form bends with straight sharp lines, angles and arrises; and form sheets into true planes free from twists, buckles, dents and other visual distortions.
- .8 Apply isolation coating to metal surfaces in contact with concrete, mortar, or dissimilar metals.

### **3. EXECUTION**

#### **3.1 REMOVALS**

- .1 Remove existing windows, doors, metal sidings, gutters, rain water leaders, and related accessories indicated or required to facilitate the Work, from the exterior walls of the building indicated on the drawings and as indicated in the Sections of Division 1. Exercise care and avoid damage to existing materials.
- .2 Identify, and confirm with Consultant, all materials designated to be re-used.
- .3 Remove carefully all items designated to be re-used and use caution in handling and storage.
- .4 Store items designated to be re-used and related accessories in an approved location, and protect from the elements and construction activities.
- .5 Protect all existing materials exposed by removal with suitable tarps, boards or covers until new work is complete.

#### **3.2 EXAMINATION**

- .1 Examine all surfaces to receive new flashings. Report to Consultant in writing any defects or discrepancies. Obtain written direction regarding corrective action required.
- .2 Do not proceed with metal flashing installation until defects are repaired.
- .3 Verify dimensions, tolerances, and method of attachment with other work.
- .4 Commencement of Work implies acceptance of existing conditions and assumes full responsibility for finished condition of the Work.

### **3.3 PREPARATION**

- .1 Re-secure all loose wood blocking and nailing strips as directed by Consultant.
- .2 Provide new blocking and nailing strips where required to ensure adequate support for new metal flashing and trim.
- .3 Replace damaged or deteriorated sections of existing wood blocking as required to ensure secure fastening of new metal flashing and trim.
- .4 Examine substrate and exposed surfaces. Repair damaged, deteriorated, or unsuitable areas prior to commencement of the Work.
- .5 Install new work promptly after removal of existing windows and trim to minimize exposure of materials to weather.
- .6 Where prompt installation of new metal is not practical, provide protection from weather to all existing exposed materials.
- .7 Take site measurements of construction to which work of this Section must conform, and through which access must be made, before work is delivered to site, to ensure that adaptation is not required which would result in a construction delay.

### **3.4 SHOP FABRICATION**

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series specifications.
- .2 Form flashings to closely match profiles shown on drawings, where indicated.
- .3 Brake form pieces in maximum lengths suitable for the work. Make allowance for expansion at joints. Cut, drill and shape in shop where possible.
- .4 Hem exposed edges on underside 12-mm minimum. Mitre and seal corners with sealant, in sliplock fashion to allow for thermal expansion.
- .5 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

### **3.5 FLASHING INSTALLATION**

- .1 Use concealed fastenings except where approved before installation.
- .2 Install metal flashings with concealed fasteners free from distortion and other defects detrimental to appearance or performance as shown and directed.
- .3 Install metal flashing with uniform wash to exterior, level in length or uniform in slope, straight in alignment with plumb upstands or faces.
- .4 Flashing shall be anchored to backup wall with corrosion resistant fasteners, plumb and

level, free of warp or twist.

- .5 Flashing shall be firmly secured by means of "S" lock cleats at seams and joints, with adequate provision for expansion and contraction.
- .6 Cover joints in horizontal flashings with matching splice covers to Consultant's approval.
- .7 Fasten splice covers with self-tapping stainless screw fasteners.
- .8 Install vertical metal flashings and trim shingle style with minimum overlap of 50 mm.
- .9 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs.
  - .1 Flash joints using S-lock forming tight fit over hook strips, as detailed.
- .10 Lock end joints and caulk with sealant.
- .11 Turn top edge of flashing into recessed reglet or mortar joint minimum of 25 mm. Lead wedge flashing securely into joint.
- .12 Caulk flashing at reglet and cap flashing with sealant.
- .13 Metal fasteners shall be compatible with metal flashings.
- .14 Heads of fasteners shall be concealed wherever possible, or otherwise shall be same colour as finished flashing.
- .15 Double-back exposed edges of metal flashing at least 12 mm.
- .16 Standing seams shall be installed at all roof parapet corners.
- .17 Protect dissimilar metal materials from electrolytic action and from contact with concrete materials with a heavy coating of bituminous paint.

### **3.6 METAL DRIP FLASHING INSTALLATION**

- .1 Fabricate new metal drip flashing as indicated and of sufficient height and width to suite existing wall configuration and increased thickness of cladding.
- .2 Install end dams, where required, of sufficient height and width to suit existing wall configuration.
- .3 Hem exposed edges on underside 20-mm. Mitre and seal corners with sealant.
- .4 Extend new metal drip flashing 25-mm beyond exterior wall surface as indicated and directed by Consultant.

### **3.7 VENT PIPES, DRAINS AND SCUPPERS**

- .1 Install new vent pipes, drains and scuppers indicated on the drawings and as indicated in the Sections of Division 1.
- .2 Install new roof flanges at all existing vent pipes. Flanges are to be 300-mm square shop primed to receive hot asphalt.

- .3 Embed all roof flanges into full bed of plastic cement and cover with three plies of felt flashings fully mopped with asphalt.
- .4 All stack vents are to be fitted with new insulated spun aluminum stack covers as per Specification Section 07 52 00.
- .5 Replace all existing scupper drains, rain water leaders, eavesthrough, and other mechanical items with new as per drawings.
- .6 Replace all existing grilles and vents with new, complete with bird security screen, made of painted perforated aluminum.
- .7 Seal all terminations and penetrations; complete details.
- .8 Coordinate work around hydro meters with Toronto Hydro. All exposed meters, conduits, etc must be enclosed as soon as possible to maintain security and to avoid injury to residents and workers.

### **3.8 PROTECTION**

- .1 The building will remain occupied during the Work; therefore it is essential that access to the existing entrances be maintained at all times. Construct and maintain hoardings, covered walkways and protective canopies as required to maintain access to the individual entrances and public safety.
- .2 Prevent overloading of any part of the Work or buildings.
- .3 Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated, without written approval of Consultant.
- .4 Provide suitable protection to prevent rain, snow or wind damage to building interior.
- .5 Provide protective barrier between the work areas and the building interior to maintain non-work areas usable and dust-free.
- .6 Protect finished work against damage of any kind, and make good all damage at this Section's expense until completion of the Work.
- .7 Provide, erect and maintain approved temporary protection for window jambs, sills and heads of openings until completion of the work.

### **3.9 CLEAN UP**

- .1 At the completion of the work each day remove all debris, garbage and excess materials from the site.
- .2 Storage of debris will not be allowed overnight.
- .3 Upon completion of the work, clean up all debris, excess materials, and equipment and

remove from site.

- .4 All drippage or spills of sealants or primers shall be cleaned to approval of Consultant.
- .5 Leave work areas clean, free from grease, finger marks and stains.
- .6 Cleaning shall be in accordance with the requirements detailed in Section 01 74 00.

**END OF SECTION**



## **1. GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

1. All work of this Section to conform to the appropriate requirements of the most recent edition of the Ontario Building Code.
2. Coordinate work of this Section, and with other related Sections, to ensure satisfactory and expeditious completion of the Work.
3. Review and update all work schedules with Consultant on a regular basis.
4. Examine the Work of this, and all related, Sections to confirm the extent, location, quality, and condition prior to commencing.
5. Discontinue work during severe rain, wind, heat, cold, or other such inclement weather and monitor time lost in relation to Environment Canada daily norms. Lost time will only be considered where actual conditions exceed norms.

### **1.2 RELATED SECTIONS**

- .1 Section 02 06 00: Selective Demolition
- .2 Section 04 20 00: Unit Masonry
- .3 Section 05 41 00: Structural Steel Stud Framing System
- .4 Section 05 50 00: Metal Fabrications
- .5 Section 06 10 00: Carpentry
- .6 Section 07 20 00: Insulation
- .7 Section 07 21 19: Spray-in-place Urethane Foam Insulation
- .8 Section 07 27 00: Air / Vapour Barrier
- .9 Section 07 42 00: Wall Panels
- .10 Section 07 46 19: Steel Siding
- .11 Section 07 48 13: Thermally Broken Rain Screen Attachment System
- .12 Section 07 52 00: Membrane Roofing - SBS
- .13 Section 07 62 00: Sheet Metal Flashing and Trim
- .14 Section 08 17 13: Entry Doors and Frames.
- .15 Section 08 42 00: Fibreglass Window
- .16 Section 09 25 00: Gypsum Wallboard

### **1.3 SUMMARY**

1. Work Included:

- .1 Furnish all labour, materials, equipment and services necessary for the removal, replacement and/or supply of all caulking and sealant materials as detailed and/or as specified in the following areas:
  - .1 Perimeter of all window, door and louver openings.
  - .2 Interior of all new windows and doors.
  - .3 Perimeter of metal exhaust vent grilles.
  - .4 Metal-to-metal joints within exhaust boxes.
  - .5 Joints along top and bottom of metal window sills.
  - .6 Along drip edges of new metal flashings as indicated and/or directed.
  - .7 Siding-to-Siding movement joints (vertical and horizontal).
  - .8 Siding-to-canopy wall joints.
  - .9 Siding-to-high pressured laminate joints.
  - .10 Siding-to parapet joints.
  - .11 Siding to metal cap flashing joints.
  - .12 Siding to flashing joints.
  - .13 Exposed screw fastener heads.
  - .14 Joints between metal flashings and counterflashing.
  - .15 Perimeter of vent collars and base flashings.
  - .16 Perimeter of all mechanical and electrical flashings.
  - .17 Stack jack flashings.
  - .18 As shown or as otherwise specified herein.
- .2 Provide correct joint configuration along cracks greater than 1/16" wide in concrete wall and/or floor slab surfaces by cutting, grinding or routing out existing concrete, to Consultant's approval.
- .3 Provide correct joint configuration, as recommended by sealant manufacturer.
- .4 Remove existing caulking and/or sealant materials from existing sealed joints as directed.
- .5 Clean and prepare all surfaces, and prime all substrate materials to a condition acceptable for the installation of the sealant materials.
- .6 Application of primer to porous surfaces is mandatory unless superior adhesion is achieved to approval of Consultant.
- .7 Masking of concrete surfaces adjacent to routed joints is mandatory to prevent contamination of balcony surfaces prepared for application of specified

waterproofing materials.

- .8 Apply the specified sealant materials.
- .9 Make good any materials affected by sealant installation procedures, or affected by sealant materials.

#### **1.4 SCHEDULE**

- .1 The installer shall allow for co-ordination between trades and shall strictly comply with the installation dates scheduled in this specification

#### **1.5 SUBMITTALS**

- .1 Before commencement of work, and before any materials are delivered to job site, submit to Consultant a complete list of materials proposed for use in the Work, including identification of manufacturer and product names. Certify that, where applicable, materials meet relevant CGSB standards. Provide any certificates requested.
- .2 Submit to Consultant all appropriate technical and product data, including written application recommendations from the manufacturer. Provide written confirmation from the manufacturer as to the compatibility of all materials to be used.
- .3 Upon request, submit appropriately sized samples of each type of material and colour to be used to Consultant for approval.
- .4 Cure samples under conditions anticipated at job site during application.

#### **1.6 REFERENCE**

- .1 Reference Standards outlined in this Section include:
  - .1 CAN/CGSB-19.13-M87 Sealing Compound, One-component, silicone, neutral curing.
  - .2 CAN/CGSB-19.24-M90 Type II, Class B, Sealing Compound, Multi-component, polyurethane, chemical curing.
- .2 Identify any revisions to the referenced standards and notify Consultant of same.
- .3 Conform to most stringent requirements of referenced standard or revision.

#### **1.7 QUALITY ASSURANCE**

- .1 All sealant materials and accessories shall be applied by a contractor approved by the manufacturer. Provide written evidence of approval from manufacturer prior to commencement of the work, on request.

- .2 Applicators shall have a minimum five (5) years proven experience in all phases of caulking work specified herein. Submit verification of experience on request.
- .3 Employ only fully trained and skilled workers and execute work in strict accordance with sealant manufacturer's printed instructions.
- .4 All materials shall be new and in perfect condition, free from defects that may impair strength, performance, durability or appearance.
- .5 Work shall be executed to the highest standards of workmanship in the industry, by fully trained applicators in strict accordance with the printed directions of the sealant manufacturer.
- .6 At no extra cost, arrange for a pre-job mandatory site training session between applicators, manufacturer's technical representative, and Consultant to review requirements relating to removal of existing sealant materials, sealant and surface preparation requirements, and re-application procedures.
- .7 Arrange for sealant manufacturer's technical representative to attend site meeting with Contractor and Consultant prior to the commencement of any caulking work to discuss the following:
  - .1 Analysis of job and weather conditions
  - .2 Anticipated frequency of joint movement
  - .3 Shape factor of various joints
  - .4 Correct size and profile of joint for sealant to be used
  - .5 Recommendations for priming joints
  - .6 Number of beads of caulking to be provided
  - .7 Inspection of surfaces and joints
  - .8 Recommendations for sealant installation
  - .9 Field adhesion testing and mock-up; and
  - .10 Aesthetic concerns.
- .8 At no extra cost, arrange for the sealant manufacturer(s) to conduct all field tests required to ascertain that full bond between sealant and substrate materials is attainable and that primers, sealants and other coatings are mutually compatible. The manufacturer shall provide written copies of such tests when requested and/or deemed necessary.
- .9 Independent Inspection & Testing:
  - .1 Owner may retain an independent Consultant to carry out periodic supervision

- during construction. If requested by Consultant, contractor to take cut-test samples of assembly, identify locations and submit to Consultant for review and testing.
- .2 Employment of Inspection and Testing agencies does not relieve the Contractor's responsibility to perform work in accordance with the Contract Documents.
  - .3 Provide assistance required for executing Inspection and Testing by the appointed agencies and/or the Consultant.
  - .4 Allow Inspection and Testing agencies and/or the Consultant access to the work.
  - .5 If required by the Inspection and Testing agency or by the Consultant, provide cuts for testing. Repair cuts without cost to the Owner.
  - .6 Contractor shall make an allowance for minimum one cut test per day and all required patching to match existing assembly.
  - .7 Failed test results will require remedial work acceptable to Consultant and may entail complete removal and replacement of failed areas.
  - .8 Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- .10 Mock up:
- .1 Install approximately 3 m of sealant in accordance with pre-job meeting to show location, size, shape, depth, and profile of joint(s) complete with all necessary back-up materials, primers, caulking and sealant materials. Verify aesthetics, workmanship, proper sealant and surface preparation procedures with manufacturer and Consultant.
  - .2 Perform field adhesion tests on mock-up sample within 7-14 days before proceeding to verify acceptability of installation.
  - .3 Approved mock-ups may form part of finished work if left undisturbed at time of Substantial Performance of the work. Remove and dispose of mock-ups which do not form part of Work.

## **1.8 SITE CONDITIONS**

- .1 Do not install the Work of this Section outside of environmental ranges as recommended by manufacturer without the Consultant's and Product manufacturer's written acceptance.
- .2 Protect all work against damage and disfigurations and work of other trades against soiling and damage arising out of this work. Upon completion, replace and repair all

defective work.

- .3 Examine substrate materials, joint voids, and note temperature/humidity conditions. Report unacceptable conditions to the Consultant.
- .4 Commencement of work implies acceptance of conditions.

#### **1.9 PRODUCT DELIVERY, STORAGE AND HANDLING**

1. Deliver all materials in original, unopened packaging with the manufacturer's labels intact.
2. Ensure that all Material Safety Data Sheets and Labels, required by the Workplace Hazardous Materials Information System (WHMIS) Regulation, are in plain view and/or readily obtained.
3. Store all materials at temperatures that will not adversely affect their performance characteristics.
4. Store all materials in such a manner so as to protect them from precipitation, ground moisture, temperature extremes, sunlight and construction activities by use of weatherproof coverings and raised platforms. Interior storage shall be employed when and where necessary, with the express written consent of the Owner.
5. Should storage on site become necessary, follow manufacturer's storage recommendations.
6. Obtain Owner's approval of the location and extent of all on-site storage areas.
7. Protect materials from freezing. Materials suspected of having been subjected to freezing are not to be used unless the manufacturer verifies, in writing, that the material has not been damaged.
8. Store materials away from open flame or ignition sources.
9. Do not transport any materials through the building.
10. Follow precautionary statements on product labels for storage and handling before use and make reference to applicable Material Safety Data Sheets.
11. Do not double stack pallets of materials.
12. Replace incorrectly stored materials at no cost to the Owner.
13. Handle all materials in a careful manner ensuring that no unsightly conditions or otherwise damaged material is incorporated into the Work.
14. Remove only in quantities required for same day use.

### **1.10 JOB SITE CONDITIONS**

1. Apply sealant materials at ambient temperatures, relative humidity, and weather conditions satisfactory to the manufacturer(s) and in any case under dry conditions only.
2. Do not apply sealants during inclement weather conditions.
3. Do not apply any sealant at ambient temperatures below 5°C without obtaining manufacturer's written recommendations for review and approval by Consultant.
4. Prior to installation, inspect areas to receive sealant materials to ensure that they are clean, dry, sound, smooth and free from dust, dirt, laitance, frost and other deleterious matter.

### **1.11 ENVIRONMENTAL AND SAFETY REQUIREMENTS**

1. Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of material safety data sheets acceptable to Labour Canada.
2. Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
3. Arrange for the building staff to operate ventilation systems on maximum outdoor air and exhaust during interior installation of caulking and sealants. Ventilate area of work as required by use of approved portable supply and exhaust fans.

### **1.12 WARRANTY**

1. The work described in this Section shall be guaranteed against all defects and deficiencies in materials and workmanship for a three (3) year period from the date of Substantial Performance of the Work.
2. Defects include, but are not limited to, sag, air pockets, wrinkles, ridges, embedded foreign materials, failure in adhesion or cohesion, air and moisture leakage, staining of adjacent materials, cracking, crumbling, melting, shrinkage, running, bubbling, or change of colour.
3. Submit each warranty:
  - .1 Identifying the party as warrantor/guarantor.
  - .2 Issued in both the Contractor's and Owner's names.

- .3 Including labour and materials necessary for removal, repair and/or replacement of defective products or originally provided as part of the Work and adjacent damages resulting from the defect.

## **2. PRODUCTS**

### **2.1 SEALANT MATERIAL DESIGNATIONS**

1. Urethanes Two Part '2A'.
  - .1 Self-Leveling to CAN/CGSB-19.24-M, Type 1, Class B.
2. Urethanes Two Part '2B'.
  - .1 Non-Sag to CAN/CGSB-19.24-M, Type 2, Class B.
3. Urethanes One Part '2C'.
  - .1 Self-Leveling to CAN/CGSB-19.13-M, Type 1.
4. Urethanes One Part '2D'.
  - .1 Non-Sag to CAN/CGSB-19.13-M, Type 2, MCG-2-25.
5. Silicones One Part '3'.
  - .1 To ASTM C920, primerless, Type S, Grade NS, Class 50, SWRI validated.
6. Acrylics One Part '4'.
  - .1 To CGSB 19-GP-5M.
7. Acrylic Latex One Part '5'.
  - .1 To CAN/CGSB-19.17-M.
8. Preformed compressible and non-compressible back-up materials '10', CFC free.
  - .1 Polyethylene, urethane, neoprene or vinyl foam. Extruded open cell foam backer rod. Size: oversize 30 to 50%.
  - .2 Neoprene or butyl rubber. Round solid rod, Shore A hardness 70.
  - .3 High density foam. Extruded closed cell polyvinyl chloride (PVC) or extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m<sup>3</sup> density, or neoprene foam backer, size as recommended by manufacturer.
  - .4 Bond breaker tape. Polyethylene bond breaker tape which will not bond to sealant.

### **2.2 MATERIALS**

1. In the context of this Specification, the terms "caulking compound" and "sealant" are deemed the same.
2. All materials under Work of this Section, including but not limited to, primers and



- sealants are to have low VOC content limits.
3. Ensure that all materials used are compatible.
  4. Primers: As recommended by sealant manufacturer(s) to ensure superior adhesion and prevent staining of adjacent materials.
  5. Cleaning Materials, Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer: Ethyl alcohol, ketone solvent, xylol, toluol, or methyl-ethyl-ketone (MEK), as supplied or recommended by sealant manufacturer(s) and compatible with all adjacent materials.
  6. Masking Tape: As supplied or recommended by sealant manufacturer(s) and compatible with all adjacent materials.
  7. Bond Breaker Tape: Pressure sensitive plastic tape, which will not bond to sealants, as supplied or recommended by the sealant manufacturer.
  8. Joint Backing Material: Polyethylene or polyurethane foam rope, as recommended by sealant manufacturer(s). Circular cross section diameter 25% greater than joint width at time of installation, compatible for use with sealant.
  9. Colours: Selected by Consultant from manufacturer's standard range colours to Consultant's approval.
  10. Joint Sealant: "Spectrem 1" by Tremco Ltd., or approved alternate.
  11. Exterior Perimeter joints of new windows and doors: silicone, "Spectrem 1" by Tremco Ltd., or approved alternate.
  12. Interior Window Perimeter Sealant: "Tremco Latex 100" by Tremco Ltd., or approved alternate, acrylic emulsion compound.
  13. Butt Joint Sealant: "Spectrem 3" silicone sealant by Tremco Ltd., CWS by Dow Corning Corporation or, approved alternate, low modulus, high-performance, silicone based, one-part silicone sealant, complying with CAN/CGSB-19.13-M87.
  14. Metal-to-Metal Joints: "Spectrem 1", "Spectrem 2" silicone sealant by Tremco Ltd., CWS by Dow Corning Corporation or, approved alternate, low modulus, high-performance, silicone based, one-part silicone sealant, complying with CAN/CGSB-19.13-M87.
  15. Vent Collars and Base Flashings: "Trade-Mate Hi-Temp Silicone Sealant" by Dow Corning Corporation, or approved alternate, one-part acetoxycure silicone sealant, complying with ASTM C920, or approved alternate.
  16. Pitch Box Filler: M-1 and 1-Part adhesive sealer materials as manufactured by Chem Link Products Inc. LLC., or approved alternate

17. Other materials: Provide appropriate information to Consultant relating to other materials necessary for the proper installation of any materials listed above.

### **3. EXECUTION**

#### **3.1 EXAMINATION**

1. Examine all existing surfaces and substrates upon which work of this Section is dependent. Report to the Consultant in writing defects or discrepancies. Commencement of work implies acceptance of existing conditions and assuming full responsibility for finished condition of the Work.
2. Before commencement of work, verify acceptability of existing site conditions with sealant manufacturer's representative with to joint size, depth and condition of substrate; that all joints can be sealed as specified in an acceptable manner and that the execution, performance and quality of work will not be adversely affected by any existing conditions.

#### **3.2 PREPARATION OF SURFACES**

1. Protect adjacent surfaces from damage. Use planks, plywood, drop sheets and other forms of protection as required.
2. Remove all existing sealants including all residual sealant materials by suitable methods to prevent damage to adjacent surfaces. Care must be taken to ensure no damage or visible change takes place to the surface of the substrate that will not be covered by the replacement sealant materials.
3. Remove existing paint coating materials in conjunction with removal of existing sealants to permit application of new caulking directly to concrete substrate.
4. Clean joints of all contaminants and impurities by abrading with a wire brush, grinding, sawcutting, or as otherwise required to permit application of new caulking.
5. Where routing out of concrete is required to achieve correct joint configuration along cracks greater than 1/16" in width carry out work to approval of Consultant prior to application of sealant.
6. Routing out of concrete surfaces is included in the price and will not be measured separately for payment.
7. Clean surfaces of all joints and spaces that are to be sealed in an approved manner. Ensure that surfaces are sound, dry and of dust, grease, oil, oxidation, other contaminants, laitance or loose and/or foreign materials which may adversely affect the

- adhesion of the sealant. Clean metals of oxides, mill and foreign materials by wire brushing, grinding or sanding.
8. Wipe metal surfaces to be sealed, except pre-coated metals, with cellulose sponges or clean rags soaked with cleaning material and wipe dry with clean cloth. Where joints are to be sealed with silicone based sealants clean joint with methyl-ethyl-ketone (MEK) only. Clean pre-coated metals with solutions or compounds that will not injure finish and which are compatible with joint primer and sealant. Check that ferrous metal surfaces are painted before applying sealant. Ensure that solvents do not damage adjacent painted/coated surfaces.
  9. Concrete shall be cured at least four (4) weeks and then cleaned by brushing, grinding, or sand blasting. Dust should then be removed.
  10. Ensure that all materials in contact with sealant are compatible.
  11. Where required, mask adjacent surfaces prior to priming and application of caulking to prevent staining and/or contamination of terrace surfaces intended for application of waterproofing.
  12. Prime inner face surfaces of the joint in accordance with sealant manufacturer's recommendations, to provide full adhesion and to prevent staining of adjacent exposed surfaces, immediately prior to caulking.
  13. Examine joint sizes and correct to achieve proper width/depth ratio as per sealant manufacturer's requirements.
  14. Install joint backing material to achieve correct joint for proper width and depth ratio of sealant.
  15. Ensure backer rod is not punctured during installation.
  16. Install backer rod with a blunt instrument to ensure that rod is not punctured during installation. Remove and replace any punctured rod immediately.
  17. Test substrate for adhesion.

### **3.3 BACK-UP MATERIAL**

1. Apply bond breaker tape where required to manufacturer's instructions.
2. Install joint filler to achieve correct joint depth and shape with approximately 30% compression.

### **3.4 MIXING**

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

### **3.5 APPLICATION**

1. Apply all sealants, primers, joint backing, bond breakers to manufacturer's printed instructions.
2. Primer selection shall be in accordance with manufacturer's written recommendations. Primer shall be applied with a clean, dry, lint-free cloth. Flooding of the surface with primer should be avoided.
3. Conform to manufacturer's printed directions for materials requiring site mixing, heating or special handling. Consult with manufacturer to determine requirements for application of sealant when ambient temperature of substrate is below 5°C.
4. Do not use sealants that have been stored for a period of time exceeding the maximum recommended shelf-life.
5. Caulk joints in surfaces to be field painted before surfaces are painted. Where surfaces to be caulked are shop primed or are already field primed, check to ensure prime paint or existing paint and sealant are compatible.
6. Apply sealant under pressure using proper tools and techniques to ensure the required full depth penetration and proper adhesion to substrate. Superficial pointing with skim bead is not acceptable.
7. Apply sealants in continuous beads. A minimum sealant substrate bond of at least 6 mm must be achieved.
8. Use sufficient gun pressure to completely and uniformly fill joints and voids to proper depth. Apply sealant immediately after adjoining Work is in condition to receive such Work. Apply sealant in continuous bead using gun with correctly sized nozzle.
9. Do not block or impede any drain holes. Ensure any existing drain holes remain unobstructed. Open up existing drain holes where required.
10. Form surface of sealant with full bead, smooth, and free from ridges, wrinkles, sags, air pockets, and embedded impurities. Neatly tool surface to a slight concave joint.
11. There shall be no air voids throughout the entire joint cross section.
12. Immediately remove excess sealant materials or droppings in an approved manner from adjacent finished surfaces, as work progresses. Do not use scrapers, chemicals, or other tools that could damage finished surfaces.

13. Ensure that methods of protection do not interfere with proper sealant curing. Consult with manufacturer(s) for appropriate curing methods and times.
14. Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint. Remove masking materials immediately after joints have been sealed and tooled.
15. Make good other work damaged by work of this Section.
16. Protect installed work of other trades from staining or contamination.

### **3.6 CAULKING SCHEDULE**

1. Exterior Window and Door Perimeters: Apply high-performance, polyurethane based, single-component sealant in exterior joints between window frames and adjacent building components.
2. Interior Window/Door Perimeter: Apply interior joint sealant specified to seal joints between interior window and door frames and mouldings and adjacent materials.
3. Louvre Perimeters: Apply high-performance, polyurethane based, single-component sealant in joints between windows and adjacent brick masonry.
4. Exhaust Grille Perimeters: Apply high-performance, polyurethane based, single-component sealant in exterior joints around perimeter of exhaust vent grilles.
5. Metal-to-Metal Joints within Exhaust Boxes: Apply high performance, silicone-based sealant in all metal-to-metal joints within exhaust boxes.
6. Metal Sills: Apply high-performance, polyurethane based, single-component sealant in joints between metal sills and adjacent building components.
7. Metal-to-Metal Joints: Apply high performance, silicone based sealant as a “moon” bead over all metal-to-metal joints between window frames and other components.
8. Metal Counterflashing: Apply high-performance, polyurethane based, single-component sealant in joints along top edge of new metal counterflashing at base of walls.
9. Vent Collars and Base Flashings: Apply one-part acetoxycure, silicone-based sealant in joints around new vent collars and base flashings.
10. Screw Fastener Heads: Apply high performance, silicone based sealant as a “cap” bead over exposed screw heads.
11. Other: Upon completion of review with manufacturer(s), obtain Consultant’s acceptance of sealant materials proposed for other incidental locations.

**3.7 CLEAN UP**

1. At the completion of the work each day remove all debris, garbage and excess materials from the site.
2. Storage of debris will not be allowed overnight.
3. Upon completion of the work, clean up all debris, excess materials, and equipment and remove from site.
4. All drippage or spillage of sealants or primers shall be cleaned to approval of Consultant.
5. Cleaning shall be in accordance with the requirements detailed in Section 01 74 00, Cleaning and Waste Management.

**END OF SECTION**

## **1. GENERAL**

### **1.1 WORK INCLUDED**

- .1 The work included in this Subcontract includes, without being limited to, the following:
  - .1 Detailed design, engineering, fabrication and installation of complete window system as shown on Drawings and as specified, all as required to meet the design criteria and Warranty provisions.
  - .2 Installation of new peel and stick flexible flashing around the perimeter of the door openings and as indicated in the drawings.
  - .3 Installation of entry doors and frames in strict accordance with both IGMAC and manufacturer's requirements and to complete satisfaction of both the Owner and Consultant.
  - .4 Installation of entry doors and frames by fully trained workers in strict accordance with manufacturer's requirements.

### **1.2 RELATED SECTIONS**

- .1 Section 02 06 00: Selective Demolition
- .2 Section 04 20 00: Unit Masonry
- .3 Section 05 41 00: Structural Steel Stud Framing System
- .4 Section 05 50 00: Metal Fabrications
- .5 Section 06 10 00: Carpentry
- .6 Section 07 20 00: Insulation
- .7 Section 07 21 19: Spray-in-place Urethane Foam Insulation
- .8 Section 07 27 00: Air / Vapour Barrier
- .9 Section 07 46 19: Steel Siding
- .10 Section 07 48 13: Thermally Broken Rain Screen Attachment System
- .11 Section 07 62 00: Sheet Metal Flashing and Trim
- .12 Section 07 90 00: Joint Sealants.
- .13 Section 08 42 00: Fibreglass Window
- .14 Section 09 25 00: Gypsum Wallboard
- .15 Section 09 91 00: Painting

### **1.3 REFERENCES**

- .1 Latest published edition of reference standards listed herein are applicable to this Project unless otherwise indicated.

- .2 Reference amendments adopted prior to the effective date of this Project are applicable unless otherwise indicated.
- .3 Reference Standards outlined in this Section include:
  - .1 CAN/CSA-A440-00/A440.1-00 (R2005): Windows
  - .2 CAN/CSA-A440.2-04/A440.3-04
  - .3 CAN/CSA-A440.4-07
  - .4 Ontario Building Code

#### **1.4 DESIGN REQUIREMENTS**

- .1 Design exterior frame assemblies to accommodate expansion and contraction when subjected to minimum and maximum surface temperature of -35°C to 35°C.
- .2 Anytime a door or window is removed, it must be replaced before the end of the work day. Temporary overnight protection of openings with plywood or tarps will not be permitted.
- .3 Patch and make good any damage to all existing condition and to any damage surface adjoining demolition works. Where Work involves interior space, such as doors and windows installation, paint the entire wall where Work is located. Colour is to be as per TCHC standard.

#### **1.5 SCHEDULE**

- .1 The installer shall allow for co-ordination between trades interfacing with the entry door installation and shall strictly comply with the installation schedule approved by the Owner.
- .2 Co-ordinate the work of this Subcontractor with the work of Subcontractors providing adjacent materials such as sealants, gypsum wallboard and the like.
- .3 Co-ordinate this work with interference work to ensure and maintain a complete thermal and vapour seal envelope.
- .4 Coordinate the work of this Section with installation of air barriers, thermal insulation materials and flashings.
- .5 Include schedule of installation, identifying each unit with door marks and numbers relating to numbering on Contract Drawings. Disruption to daily living of the tenants shall be kept to minimum.
- .6 Provide a minimum five (5) business day's notice to the Consultant team and client prior to installation of any door and frame.



## **1.6 SUBMITTALS**

- .1 Product data: Submit product data sheets in accordance with Sections 01 33 00 and 01 77 00.
- .2 Shop drawings:
  - .1 Submit shop drawings in accordance with Section 01 33 00 for each type of door and frame indicating:
    - .1 Thickness and type of fibreglass.
    - .2 Thickness and type of core.
    - .3 Location of mortises, reinforcement, anchorages, joining, welding, sleeving, exposed fasteners, openings and arrangement for hardware.
    - .4 Show details of connecting work of this Section with work of adjacent Sections.
  - .3 Include schedule of installation, identifying each unit with door marks and numbers relating to numbering on Contract Drawings. Disruption to daily living of the tenants shall be kept to minimum.
  - .4 Provide a minimum five (5) business day's notice to the Consultant team and client prior to installation of any door and frame.
  - .5 Indicate materials and details in scale full size for head, jamb and sill, profiles of components, interior and exterior trim, junction between combination units, elevations of unit, anchorage details, location of isolation coating, description of related components and exposed finishes, fasteners, and caulking. Indicate location of manufacturer's nameplates.
  - .6 Shop drawings shall be sealed by a Professional Engineer registered in the Province of Ontario.
  - .7 Submit one (1) representative model of each type of entry door. Include frame, sash, sill, glazing and weatherproofing method, insect screens, surface finish and hardware. Show location of manufacturer's nameplates.
  - .8 Upon request, obtain from entry door manufacturer and submit to Consultant certified copy of test data from recognized independent testing laboratory confirming performance requirements of doors.
  - .9 Before commencement of work, and before any materials are delivered to job site, submit to Consultant a complete list of materials proposed for use in the Work, including identification of manufacturer and product names. Certify that, where applicable, materials meet relevant CGSB and CSA standards. Provide any certificates requested.
  - .10 Obtain from entry door manufacturer and submit to Consultant operation and

maintenance data for doors for incorporation into Operation and Maintenance Manual.

### **1.7 WARRANTY**

- .1 Fiberglass Material: 20 years against premature deterioration
- .2 Sealed Units: 10 years against sealed unit failure
- .3 Hardware: 5 years against malfunction
- .4 The work described in this Section shall be guaranteed against all defects and deficiencies in materials and workmanship for a ten (10) year period from the date of Substantial Performance of the Work.
- .5 Defects include, but are not limited to:
  - .1 Water leakage beyond air/vapour seal.
  - .2 Loosening of glazing and/or anchorage.
  - .3 Formation of condensation on glass or frames based on manufacturer's design parameters.
  - .4 Sealant failure.
- .6 Submit each warranty:
  - .1 Identifying the party as warrantor/guarantor.
  - .2 Issued in both the Contractor's and Owner's names.
  - .3 Including labour and materials for removal, repair and/or replacement of products provided as part of the Work and adjacent damaged materials.

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

- .1 Deliver, store and handle materials in original, unopened packaging with the manufacturer's labels intact and in accordance with Section 01 11 01 and with manufacturer's written instructions.
- .2 Adequately protect finishes to prevent damage thereto during fabrication, storage, shipping, handling and installation.
- .3 Entry door units will be stored on site to Owner's approval.
- .4 Deliver, handle and store units by methods approved by manufacturer. Store units at site on wood platforms raised above grade or in enclosures protected from elements and corrosive materials. Stack units vertically in manner to prevent raking. Do not remove from crates or other protective covering until ready for installation.
- .5 Protection of this work shall be the responsibility of this Subcontractor.
- .6 Store all materials in such a manner so as to protect them from precipitation, ground

- moisture and temperature extremes by use of weatherproof coverings and raised platforms. Interior storage shall be employed when and where necessary.
- .7 Accessory materials such as sealants, mastics, tapes, adhesives, primers and surface conditioners shall be stored at temperatures appropriate for those materials. Follow precautionary statements on product labels for storage and handling before use and make reference to applicable Material Safety Data Sheets.
  - .8 Store entry door units in an upright position in a clean and dry storage area.
  - .9 Provide methods for lifting or hoisting units into place without causing damage.

## **1.9 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Single Source Responsibility: ensure primary materials provided in this Section are obtain from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers.
  - .2 All entry doors and related components shall be by the same manufacturer.
  - .3 All entry doors and related accessories shall be installed by a Contractor approved by the manufacturer. Provide written evidence of approval from manufacturer, upon request.
  - .4 Installers shall have a minimum of five (5) years proven experience in the application of the products, systems and assemblies specified herein.
  - .5 Employ only fully trained and skilled workers and execute work in strict accordance with sliding doors manufacturer's requirements.
  - .6 Arrange for entry doors manufacturer's technical representative to attend site meeting with Contractor and Consultant prior to the commencement of the work to discuss the installation procedures and unique conditions.
- .2 Mock-ups:
  - .1 Arrange with Consultant to assist in preparing a schedule fixing the date for mock-up review.
  - .2 Prepare mock-up for the Consultant's and Owner's review, promptly and in an orderly sequence, to avoid delay in the schedule of the Work.
  - .3 Failure to prepare mock-ups in ample time will not be considered sufficient reason for an extension of Contract Time and delay claims.
  - .4 Arrange with Owner's representative and Consultant to identify a location for the establishment of the mock-up representing all phases of the work. The mock-up will

- demonstrate the materials, procedures, sequences, finishes, and general quality of the work required.
- .5 Modify mock-up in accordance with the Owner and Consultant's review.
  - .6 Provide mock-up using personnel assigned to the Work, and products and techniques to be used on the Work.
  - .7 Mock-up shall serve as the standard for installation workmanship for the remaining parts of the Work.
- .3 Independent Inspection & Testing:
- .1 The Owner for the purpose of inspecting and/or testing portions of the Work may engage Independent Inspection & Testing agencies.
  - .2 During the installation, Owner may arranged for testing and inspection of the work randomly without prior notification.
  - .3 Employment of Inspection & Testing agencies does not relieve the Contractor's responsibility to perform work in accordance with the Contract Documents.
  - .4 Provide assistance required for executing Inspection & Testing by the appointed agencies.
  - .5 Allow Inspection & Testing agencies and/or Owner representative's access to the Work both on the site and at offsite manufacturing and/or fabrication plants.
  - .6 Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

#### **1.10 JOB SITE CONDITIONS**

- .1 Install entry doors at ambient temperatures, relative humidity, and weather conditions satisfactory to the manufacturer and, in any case, under dry conditions only.
- .2 Do not install entry doors during inclement weather conditions.
- .3 Maintain ventilated environment for 24 hours after installation.
- .4 Maintain minimum ambient temperature before, during and 24 hours after installation of sliding doors components.

#### **1.11 WASTE MANAGEMENT AND DISPOSAL**

- .1 Divert uninstalled materials for reuse at nearest used building materials facility or similar type facility.
- .2 Divert unused caulking and sealant materials from landfill through disposal at special wastes depot.

- .3 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.
- .4 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .5 Dispose of corrugated cardboard, polystyrene, plastic, packaging material in appropriate on-site bin for recycling in accordance with site waste management program.
- .6 Packaging Waste Management: remove for reuse and return of pallets, crates, padding and packaging materials as specified in in accordance with Section 01 74 21.

## **2. PRODUCTS**

### **2.1 ENTRY DOORS**

1. 5000 Series Fibreglass Entry Door assemblies, as manufactured by Inline Fiberglass Ltd., Integrity windows and doors, made with Ultrex pultruded fiberglass, as manufactured by Marvin Windows and Doors, or approved alternate

### **2.2 PERFORMANCE CRITERIA**

1. Based on CAN/CSA Standard A440-00/A440.1-00 (R2005), the entry door units shall comply with the following minimum criteria:
  - .1 Air Tightness: A3
  - .2 Water Tightness: B2
2. Entry doors and their weather-stripping shall be sufficiently air tight. Demonstrate that Weatherstripping is air tight and can be replaced easily.

### **2.3 MATERIAL COMPATIBILITY**

1. All materials used in conjunction with one another must be compatible.

### **2.4 COLOUR**

1. Entry door and frame colours shall be as indicated:
  - .1 Exterior frame surface: To owner's selection.
  - .2 Interior frame surface: To owner's selection.

### **2.5 FIELD MEASUREMENTS**

1. Site measure all rough door openings in relation to pre-fabricated doors to ensure achievement of specified tolerances.
2. All site measurements must be conveyed to General Contractor and agreed upon for coordination and preparation of openings.

3. Immediately report any discrepancies to Consultant.

#### 2.6 AIR/VAPOUR SEAL MEMBRANE

1. Provide door frames with site installed air/vapour seal membrane materials to achieve continuous air seal around door frame perimeters to adjacent wall system.
2. Install air/vapour seal membrane as specified in Section 07 19 60.
3. Air/vapour seal membrane materials shall be compatible with door frame materials.

#### 2.7 DOOR FRAME ANCHORS

1. Material: Aluminum or stainless steel.  
Thickness: As required by manufacturer's engineering analysis.
2. Provide continuously around door, mitre and seal corners.

#### 2.8 METAL FLASHING

1. Metal sill and head flashings as specified in Section 07 62 00.

#### 2.9 ACCESSORIES AND TRIM

1. All exterior and interior mouldings and trim as required to suit existing wall thickness as indicated or required.

#### 2.10 DOOR INSULATION

1. Fibreglass AF545 or Roxul RXL40.
2. Fill all voids within door/flushing cavities with insulation in accordance with manufacturer's recommendations.

#### 2.11 FRAMING AND ANCHORAGE

1. In accordance with door manufacturer's recommendations, design and provide framing, blocking, anchors, shims and reinforcing required for the connection and positioning of the work of this Section to the structure.
2. In accordance with door manufacturer's recommendations, design and supply anchorage required for the connection and positioning of the work of this Section to the structure.
3. In accordance with door manufacturer's recommendations, design and provide a complete anchorage system required for the connection and positioning of the work of this Section to the structure.
4. In accordance with door manufacturer's recommendations, design framing system,

fastening and anchoring to accommodate building deflection and construction tolerances.

## 2.12 MATERIALS

1. The following materials establish minimum standards for the components of the work of this Section.
2. Energy star rated high performance fiberglass door:
  - .1 All frames, and sash profiles are made from Pultruded Fiberglass, having nominal wall thickness of 2.3mm (0.090") with minimum fiber glass content of 60%. Non-structural accessory members are permitted to be in vinyl or aluminum and are identified as such. Brickmold to be aluminum factory installed.
  - .2 Provide Alternate Insulated Hollow Metal Door Panel cost: Strassburger 6000 Series, or approved alternate, metal-edge steel door fabricated with 4-piece construction including 24 gauge galvanized steel strike side and hinge side facings, wood top rail and composite bottom rail. Insulated core to be poured-in-place polyurethane foam. Bottom rail to be machined to accept weather seal. Face pattern, profile and colour to Owner's selection.
3. Door frame:
  - .1 Provide new fiberglass frame for all doors in the project, front and back entry doors (unit #1 – 12, #14 – 56).
  - .2 Made with 4 5/8" (117.5mm) or 6 5/8" (168mm) pultruded fiberglass lineals.
  - .3 Injection molded plastic corners are to be used and fastened in place with screws,
  - .4 Composite block 4" (102mm) long is installed at bottom of vertical jamb to provide life-long protection against rot.
  - .5 Hinges and strike plates are mortised into the frame and have composite blocking as backing.
  - .6 Pre-finished in urethane paint with satin sheen.
  - .7 Provide Alternate Hollow Metal Door Frame cost: Frame: Steel frame extrusions. Size and profile to suit existing field conditions and as indicated.

## 2.13 ACCESSORIES

1. Sill:
  - .1 Provide steel sill on the exterior: top and both sides. Colour to match fiberglass window frame.
  - .2 Provide interior enclosure on the interior: top and both sides. Enclosure to be stained

- maple wood.
- .3 Inswing application, 1 ¼" (32mm) high, Endura Sill system, or approved alternate, with adjustable sill cap in black, composite subbase.
- .4 Outswing application, low or high profile bumper type profile, comes with foam compression weather-strip installed, composite subbase.
- .5 Barrier-free application, light or heavy duty 1/2" (13mm) tall low-profile sill with thermal break.
- .6 Provide full range of colour of sill finishes for Consultant's approval.
- 2. Frame sealants: Type as recommended by frame manufacturer.
- 3. Shims: painted pine.
- 4. Door panel:
  - .1 Rail and Stile Panel system.
  - .2 Panel is made with 4 fiberglass pultrusions and fitted at corners with mortise and tenon joinery.
  - .3 Side Stiles are 4" (102mm) wide, Top rail is 4" (102mm) tall and Bottom Rail is 8" (203mm) or 4" (102mm) tall.
  - .4 Glass frame is an integral part of the door panel with glass heel beaded in frame and interior glass stop.
  - .5 Factory installed hardware into panel.
  - .6 Panel is to be constructed with internal full length wood side stiles 4" (102mm) wide, composite edges are used on the sides, top and bottom of panel to provide long term protection against water infiltration into panel, Smooth SMC fiberglass skins are to be used on the exterior and interior and glued to the wood internal structure and composite edging
  - .7 Install latch and deadbolt, and special mortise lock and Master Key.
  - .8 Pre-finished in urethane paint with satin sheen on the exterior and interior.

## 2.14 FABRICATION

- 1. Members:
  - .1 Fabricate generally to dimensions and profiles indicated on reviewed shop drawings and to meet specified requirements. Determine door dimensions from site measurements. Maintain site lines indicated and clearances to other construction components.
  - .2 Reinforce members for attachment of hardware.



- .3 Ensure that glazing rabbet is provided with depth and width to accommodate specified glass units.
- .4 Maintain a minimum clearance of 6 mm and a maximum clearance of 13 mm between the door frame and the rough opening.
- 2. Assembly of Units:
  - .1 Incorporate weep holes to drain off pocketed water. Baffle to prevent entry of driven water to conform to specified performance.
  - .2 Except where shipping makes impossible, fabricate units in shop and ship completely assembled with operating hardware attached.
- 3. Fastenings:
  - .1 Use stainless steel.

## 2.15 FINISHES

- 1. All exposed surfaces are coated with durable acrylic urethane top coat with a medium Gloss of 17-35. In compliance with AAMA-323. Provide full range of standard colour sample for Consultant's approval.

## 2.16 SLIDING GLASS DOOR

- 1. PRODUCT:
  - .1 600 Series Fiberglass Sliding Door as manufactured by Inline Fiberglass Limited, Marvin Windows and Doors or approved alternative. Frames are 145mm (5-3/4") deep and comprise an interior operating panel and an exterior fixed panel. Sliding Glass Doors shall be in accordance with NAFS – AAMA/WDMA/CSA 101/I.S.2/A440-08 and CSA A440 S1-09 can supplement section 5.
  - .2 The sliding door units shall comply with the following minimum criteria:
    - .1 Air Tightness: A3
    - .2 Water Tightness: B2
    - .3 Wind Load Resistance: C3
- 2. MATERIALS
  - .1 All frame and sash profiles are made from pultruded fiberglass having a nominal wall thickness of 2.3mm (0.090"). Non-structural accessory members are permitted to be vinyl or aluminum and identified as such.
- 3. CONSTRUCTION
  - .1 Frame and panel corners are connected with metal or molded reinforced polymer

components and mechanically secured. Joints are factory sealed and neatly fitted together. The perimeter of open-back frames shall be filled with insulation.

4. HARDWARE

- .1 The sliding panel and fly screen are equipped with two adjustable, double, tandem rollers fitted with nylon wheels. Locking handle is an attractive, die-cast zinc assembly with double hook. Frame sill member shall include stainless steel track liners. Door travel limit bumpers shall be provided at head and sill of jambs, for fully open and closed positions as well as anti-lift blocking to provide resistance to forced entry. A sill mounted foot lock and/or a cylinder lock, is available as an option.

5. FINISH

- .1 All exposed surfaces are coated with polyurethane enamel top coat with a medium gloss of 17-35. In compliance with AAMA-623.

6. WEATHER-STRIPPING

- .1 Double line of silicone coated woven pile with integral fin at interior to provide air and vapor seal.

7. GLASS

- .1 Operating and Fixed Panels are glazed with 22mm (7/8"), insulating glass units comprising safety glass components. Glass thickness shall be in accordance with applicable Building Codes. Install double-sealed insulating glass units certified by IGMAC or SIGMA.
- .2 Glazing shall be: tempered safety glass, with low-E coating on the second surface, warm edge spacers, and filled with Argon gas.

8. GLAZING METHOD

- .1 Primary seal: polyisobutylene, secondary seal: silicone but the IGU manufacturer should provide a compatibility test or a letter confirming compatibility.
- .2 The fixed and operating sashes utilizes laid-in glazing using polyethylene closed cell tape on the exterior and a PVC glass stop locked-in from the interior provides a secure and positive seal for the glass.

9. INSECT SCREENS

- .1 A heavy-duty extruded frame with Fiberglass mesh.

10. INSTALLATION

- .1 Shall be performed by experienced installers in accordance with manufacturer's instructions and CSA-A440.4. Window shall be plumb and square after installation is complete and sealed to both interior and exterior walls with a high sealant around the

perimeter of the frame. Perimeter cavity is to be foamed, additional anchorage is required to prevent bowing. It shall be the responsibility of the installers to make all necessary final adjustments to ensure normal and smooth operation.

#### 11. MAINTENANCE

- .1 To maintain performance and ease of operation, clean glass, frames and insect screen, vacuum weather stripping and sill, lubricate hardware and weather-stripping with only silicone sprays. Adjust roller wheels to center clearance and ease operation.

#### **2.17 ACCESS DOOR – INSULATED STEEL DOOR WITH THERMAL BREAK**

1. Exterior doors: comply with requirements of CAN/CGSB-82.5, Insulated Steel Doors.
2. Metal: tension levelled sheet steel to ASTM A568/A568M, Class 1, with ZF120 galvanized coating on both sides designation to ASTM A653/A653M
3. Door cores:
  - .1 Fill hollow space within door from top to bottom with rigid poly-isocyanurate, closed cell insulation, 32 kg/m<sup>3</sup> minimum, thermal value RSI 2.0.
  - .2 Continuous interlocking steel ribs: 0.9 mm thick continuous interlocking steel stiffeners at 150 mm O.C., securely welded to each face sheet 150 mm O.C. maximum.
4. Exterior top caps: rigid PVC extrusions to CGSB 41-GP-19Ma. Supply and install inverted, recessed, fully welded channels at top and bottom of doors, supply and install PVC top caps.
5. Frame thermal break: extruded, rigid polyvinyl chloride.
6. Filler: polyester based.
7. Primer: zinc rich, organic, ready mix to CAN/CGSB-1.198.
8. Door bumpers: to ANSI/BHMA-A156.16, type L03011.
9. Gasket: self-adhering, closed cell foam of black vinyl copolymers.
10. Screws: stainless steel screws with countersunk flat head.
11. Frame anchors: countersunk galvanized expansion bolts complete with galvanized anchor, base anchors, and spacers behind hollow metal frame.
12. Floor anchors: 1.6mm minimum adjustable floor clip angles with 2 holes for anchorage to floor.
13. Lite, Glazing: double glazed, gas filled, glass to be factory supplied and pre-installed.
14. Fabricated doors with joints between front and back panels meeting on stile edges. Make joints continuously welded for entire height of door. After welding has been completed,

- grind joints smooth to match metal. Ensure that no filler is used in joints.
15. Doors: material thickness, opening classification and duty rating to CSDMA "Recommended Selection and Usage Guide for Commercial Steel Doors", hollow steel construction, filled with insulation, edges continuously welded and filled and sanded flush with no visible seams. Provide top cap filled and ground flush on exterior doors. Close bottom edge of doors where indicated.
  16. Frames and screens: 1.6 mm steel, welded type. Exterior frames with continuous thermal break. Anchors adjustable, type to suit each jamb condition.

## **2.18 STORM DOORS**

- .1 Provide and install aluminum combination storm and screen doors at all swing doors in compliance with the latest edition of CGSB 82-GP-3M.
- .2 Storm door shall be installed on all entry doors, front and back, to all of the units (#1 to #12 and #14 to #56).
- .3 Frame Components:
  - .1 All frame components shall be 6063 T6 aluminum extrusion (1 1/4" or 32mm depth) for additional strength and appearance. Thickness shall be  $0.050 \pm 0.005$ .
  - .2 Paint is electro statically applied baked-on polyester or acrylic.
  - .3 Door panel shall be miter-sawed, mechanically fastened with zinc plated screws, and incorporate a gusset joining system at the corners.
  - .4 The kick panel shall be constructed of heavy duty 20 gauge steel.
  - .5 The door shall have (no cut) steel roll formed z-bars attached for mounting the door unit in the building opening.
  - .6 Provide z-bar. The hinge z-bar shall be factory made with four 3-inch (76mm), spring loaded, aluminum leaf hinges, supported by wear-resistant bronze bushings. Z-bars shall be weather-stripped with non-absorbent pile. The top z-bar shall be extruded aluminum and shaped to serve as a drip cap above the door.
  - .7 Provide hold open hardware.
- .4 Window Unit Construction:
  - .1 All aluminum window unit with two-self-storing glass inserts and one screen shall be factory installed and fitted to complete the door unit. The top glass insert can be pulled down for top ventilation. All glass panels shall be  $0.050 \pm 0.005$  wall thickness aluminum extrusion, miter sawed, metal keyed, and have mechanically connected corners. Glass shall be tempered safety glass meeting the 16 CFR 1201-II Standard,

- per ANSI Z97.1 testing procedures. Glazing method shall be a flexible vinyl weather-strip with wrap-around marine-type extrusion.
- .2 Provide screen mesh on the opening section of the door. Screen panel shall be a roll formed aluminum frame with fiberglass screen mesh.
  - .3 All window panel latches and tilt keys shall be zinc die-cast metal. Window sill area shall be sloped to the exterior to allow water drainage.
- .5 Weather-strip:
- .1 The door shall be sealed against z-bar trim with non-absorbent woven pile. The door shall have an adjustable 2" (51mm) vinyl extruded expander with flexible vinyl weather-stripping that is field adjusted to seal the door along irregular thresholds.
- .6 Hardware:
- .1 The hardware kit shall consist of a surface mounted lever-type exterior handle latch with a lock on the inside. It shall also have one heavy-duty pneumatic closer and all necessary screws and fasteners to complete the installation.
- .7 Finish:
- .1 All exposed extruded aluminum components shall be color coated in accordance with AAMA 2603-98 specifications. Colour is to be white. All fasteners shall be painted or zinc plated.
- .8 Installation:
- .1 Doors shall be installed as per instructions furnished with each door, using color matched zinc plated exterior installation screws.
- .9 Warranty Registration Number:
- .1 Provide at least 10 year warranty.
  - .2 Each door shall have a registration label displaying an identification number, which is to be registered with Larson Manufacturing Company, or approved alternate, upon installation of the door per warranty card provided.

### **3. EXECUTION**

#### **3.1 CONVEYANCE**

- .1 Submit detailed proposed method of accessing site including transportation and hoisting of door units.
- .2 Method of accessing site shall be to approval of Owner.
- .3 Scaffolding:
  - .1 Provide scaffolding.

- .2 Prior to design/erection of scaffolding, determine loading requirements.
- .4 Hoisting:
  - .1 Provide, operate and maintain lifting equipment required for installation of the door units.
  - .2 Qualified operators shall operate hoists.
  - .3 Locations and means for securing chain blocks, hoists or similar hoisting equipment to building structure shall be approved by Owner. Repair any damage for such activity at Contractor's expense.
  - .4 Hoisting of materials over roofs shall not be permitted.

### **3.2 EXAMINATION**

- .1 Verify condition and dimensions of previously installed Work upon which this Section depends. Report defects to the Consultant. Commencement of Work means acceptance of existing conditions. When existing damage is discovered, provide dated and stamped photograph to the Consultant. General contractor shall report any damage discovered.
- .2 Verify that substrate openings and surfaces are ready to receive work and opening dimensions are as instructed by manufacturer.
- .3 Verify wall openings and adjoining air and vapour seal materials are ready to receive work of this Section.
- .4 Before installation, take critical site measurements to verify dimensions, tolerances, and method of attachment with other work.
- .5 Before installation, verify that wall openings for doors are correctly sized and within tolerance.
- .6 Beginning of installation means acceptance of existing conditions.

### **3.3 REMOVAL AND PREPARATION**

- .1 Remove and dispose of all existing entry doors. Remove existing door units in a manner that does not damage adjacent wall components or surfaces.
- .2 Inform Consultant of any unusual or deteriorated conditions revealed during door removal. Allow Consultant to review conditions prior to covering.
- .3 Co-ordinate dimensions, tolerances, and method of attachment with other work.
- .4 Supply anchorage devices and inserts to the appropriate Sections where required for building in or casting-in-place and instruct as to proper location and position.
- .5 Remove dust and other loose material from openings.

### **3.4 INSTALLATION**

- .1 Install doors in accordance with manufacturer's instructions and most recent version of CSA A440 installation guide, complete with necessary reinforcing and incidental components.
- .2 Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- .3 Install frames, screens, doors and hardware plumb, square and level in accordance with manufacturer's instructions and templates.
- .4 Erect work of this Section true and plumb, free of warp or twist, and securely fasten in place with door anchors shown on shop drawings.
- .5 Provide thermal isolation where components penetrate or disrupt insulation materials.
- .6 Provide all accessories including trim, drips and closures.
- .7 Arrange components to prevent abrupt variation in colour.
- .8 Install metal flashings with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces.
- .9 Measure and cut flashings to fit door openings.
- .10 Coordinate attachment and seal of perimeter air barrier and vapour barrier materials.
- .11 Install thermal insulation materials around perimeter of entry doors in accordance with manufacturer's instructions to provide continuity of thermal insulation as shown and/or specified.
- .12 Do not use expansive foam sealant unless acceptable to door manufacturer.
- .13 Provide even margins between doors and jambs and doors and flooring and thresholds as follows:
  - .1 Hinge side: 1.0 mm.
  - .2 Latch side and head: 1.5 mm.
  - .3 Flooring and thresholds: 13 mm.
- .14 Include anchors and fastenings necessary to anchor work to other Trade Contractor work. Supply items and inserts required to be built into work. Secure anchorages and connections to adjacent construction. Provide instructions and verify proper positioning.
- .15 Accurately fit and frame together units and provide flush hairline joints with connections made watertight.
- .16 Ensure adequate clearance and shim space at perimeter of openings.
- .17 Inject foam insulation between door frames and adjacent construction to provide air and vapour seal.

- .18 Fasten the windows with strap anchors or through frame to ensure rigidity.
- .19 Ensure no fasteners compromise the watertightness of the frame elements.
- .20 Seal joints between frame members and other non-operating components with sealant to provide weathertight seal at outside and air vapour seal at inside.
- .21 Patch and make good any damage on the existing exterior and interior elements.
- .22 The interior wall where Work has occurred shall be painted in its entirety. Colour is to be as per TCHC standard and direction.

### **3.5 ADJUSTMENT AND CLEANING**

- .1 Adjust doors for smooth and balanced door movement.
- .2 Clean doors, frames and screens.
- .3 Remove as work progresses, all corrosive and foreign materials which may set or become difficult to remove at time of final cleaning or which may damage members.
- .4 Select, apply and maintain cleaning and protective methods to ensure finishes will not become uneven or impaired as a result of unequal exposure to light and weathering conditions.
- .5 Perform final cleaning after completion of entire installation when so directed by the Contractor.
- .6 Adjust hardware and operating parts for proper operation.
- .7 Clean exposed surfaces using manufacturer's recommended materials and methods. Remove labels and visible markings. Remove and replace work that cannot be successfully cleaned.
- .8 Touch-up damaged coatings and finishes using non-abrasive materials and methods recommended by manufacturer. Eliminate all visible evidence of repair.
- .9 Protect finished work from damage.

### **3.6 CLEAN UP**

- .1 At the completion of the work each day remove all debris garbage and surplus materials from the site.
- .2 Storage of debris will not be allowed overnight.
- .3 Remove protective material from vinyl and glass surfaces.
- .4 Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- .5 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable



to sealant manufacturer.

- .6 Clean and polish glass on the exterior and interior and remove markings indicating the presence of glass.
- .7 Cleaning shall be in accordance with the requirements detailed in Section 01 74 00, Cleaning and Waste Management.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 SECTION INCLUDES**

- .1 Work included: provide sectional overhead doors including but not limited to following:
  - .1 Insulated sectional overhead door.
  - .2 Operating hardware, door guides, tracks and accessories.
  - .3 Counterweight and counterweight enclosures.
  - .4 Fender guards for overhead door tracks.
  - .5 Supplementary steel supports required for installation.
  - .6 Electric operators, motors, control panels, loop detectors, photo-electric devices, remote controls for vehicles, etc., and electric work as specified.
  - .7 Shop priming.
- .2 Related requirements: Specifications throughout entirety of Divisions of this Project are directly applicable to this Section, and this Section is directly applicable to them.

### **1.2 RELATED SECTIONS**

- .1 Section 02 06 00: Selective Demolition
- .2 Section 08 17 13: Entry Doors and Frames.
- .3 Section 09 25 00: Gypsum Wallboard
- .4 Section 09 91 00: Painting
- .5 Section 05 50 00: Metal Fabrications
- .6 Section 06 10 12: Carpentry
- .7 Section 07 90 00: Joint Sealing
- .8 Section 08 71 00: Finish Hardware
- .9 Electrical Drawing Set: Electrical service connection to door controller.

### **1.3 REFERENCES**

- .1 ASTM A123/A123M-11 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 ASTM A653/A653M-11 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .3 CAN/CSA-G40.20/G40.21-M, General Requirements for Rolled or Welded Structural Quality Steel/ Structural Quality Steels.
- .4 CSA S136.1-M, Commentary on CAN/CSA S136-M, Cold Formed Steel Structural Members.

- .5 CAN/CGSB 1.181, Coating, Zinc-Rich, Organic, Ready Mixed.
- .6 CSA-C22.1-12 - Canadian Electrical Code, Part I (22th Edition), Safety Standard for Electrical Installations.
- .7 CAN/CSA-C22.2 No. 100-04 (R2009) - Motors and Generators.
- .8 NEMA MG1-2011 - Motors and Generators.

#### **1.4 SYSTEM DESCRIPTION**

- .1 Provide a 45mm (1-3/4") thermally broken insulated flush overhead door, electrically operated complete with safety edge.
- .2 Panels: Insulated steel, with plain - no ribs.
- .3 Lift Type: Low headroom operating style with track and hardware.
- .4 Operation: Electric.

#### **1.5 SUBMITTALS**

- .1 Submit submittals in accordance with Section 01 33 00.
- .2 Product Data:
  - .1 Submit one copy of product data sheets in accordance with Sections 01 33 00 and 01 77 00.
  - .2 Product data sheets shall provide all required information and consist of catalogue cuts, manufacturer's name and number, finish and reference identification to specified standard.
  - .3 Provide component construction, anchorage method, hardware, and steel perforated grille ventilation insert.
  - .4 Submit 3 copies of detailed instructions for maintaining, preserving and keeping materials in clean and safe conditions and give adequate warning of maintenance practices or materials detrimental to specified materials. Submit manufacturer's installation instructions.
  - .5 Material Safety Data Sheets: Submit MSDS for inclusion in Operation and Maintenance Manual without limitations for adhesives, sealants, patching and leveling compound, solid polymer and as designated later by Consultant.
- .3 Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, installation details and operations.
  - .1 Clearly show and describe in detail, detailed door assemblies, and adjacent construction,

including elevations, materials, sections, and details of door, track, hardware, and operating components, dimensions, gauges, finishes, and of relationship of door, frames, track, hardware, accessories, service rating, and operating components to adjacent construction. Submission includes detailed descriptions and catalog cuts of specified door controls.

- .2 Submit complete electrical schematics with Shop Drawings.
- .4 Samples:
  - .1 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.
  - .2 After approval samples will be returned for incorporation in Work.
  - .3 Samples: Submit two (2) panel finish samples, 300mm x 300mm (12"x12") in size, illustrating colour, perforation, and finish.
- .5 Hardware List:
  - .1 Submit contract hardware list prepared by a Certified Architectural Hardware Consultant, and in accordance with Section 01 33 00.
  - .2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.
- .6 Certificates: provide product manufacturer certificates certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .7 Closeout Submittals:
  - .1 Identification: Manufacturing name, type, year, and serial number.
  - .2 Performance criteria and maintenance data.
  - .3 Operating instructions and precautions.
  - .4 Safety precautions.
  - .5 Include electrical control adjustments and operators.
  - .6 Component parts availability including names and addresses of the suppliers, include data for motor, transmission, shaft and gearing, lubrication frequency, spare part sources. Provide operating instructions, precautions operation, and maintenance data for door closers, locksets, door holders, electrified hardware and fire exit hardware for incorporation into manual specified in Section 01 33 00.
  - .7 Conduct briefing of maintenance staff regarding proper care, cleaning, and general maintenance.
  - .8 Warranty Documentation: Submit manufacturer warranty and ensure forms have been

completed in Owner's name and registered with manufacturer.

**.8 Operation and Maintenance Data:**

.1 **Manufacturer's Instructions:** submit manufacturer's installation instructions. Installation Data: Manufacturer's installation requirements, special procedures and perimeter conditions requiring special attention.

1. Wiring Diagram: "As built" straight line wiring diagrams showing electrical connections and control circuitry.
2. Instructions explaining operation.
3. Lubrication chart indicating lubrication points and type of lubricant recommended for equipment.

**1.6 QUALITY ASSURANCE**

- .1 Use abbreviations and symbols recommended in "Abbreviations and Symbols as used in Architectural Door and Hardware Schedules and Specifications", published by the Door and Hardware Institute.
- .2 Use hardware schedule format recommended in "Sequence and Format for the Hardware Schedule", published by the Door and Hardware Institute.
- .3 **Regulatory Requirements:** hardware for doors in fire separations and exit doors shall be certified by a Canadian Certification Organization accredited by Standards Council of Canada.
- .4 **Manufacturer Qualifications:** Company specializing in manufacturing the Products specified in this section with minimum five (5) years documented experience.
- .5 **Installer Qualifications:** Company specializing in performing the work of this section with minimum five (5) years documented experience and approved by the manufacturer.

**1.7 REGULATORY REQUIREMENTS**

- .1 Conform to applicable code for motor and motor control requirements.

**1.8 WARRANTY**

- .1 Provide ten (10) year manufacturer's warranty for degradation of finish, including cracking, rust through or delamination.
- .2 Provide five (5) year manufacturer's warranty for electric operating equipment.

**1.9 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 11 01 and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Package items of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .4 Storage and Handling Requirements:
  - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect door hardware from nicks, scratches, and blemishes.
  - .3 Protect prefinished surfaces with wrapping.
  - .4 Replace defective or damaged materials with new.

#### **1.10 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse, recycling, composting and anaerobic digestion in accordance with Section 01 74 21.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Dispose of corrugated cardboard, polystyrene plastic packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

## **2. PRODUCTS**

### **2.1 MATERIALS**

- .1 Products of following manufacturers are acceptable subject to conformance to requirements of drawings, schedules, and specifications:
  - .1 Sectional Overhead Door: Thermalex 2000, Series TX450-20, Polyurethane Insulated Steel Door; manufactured by Upwardor Corp., [www.upwardor.com](http://www.upwardor.com),
  - .2 Or approved alternate.
- .2 Substitution Limitations: This Specification is based on Thermalex 2000, Polyurethane Insulated Steel Door; manufactured by Upwardor Corp. comparable products from manufacturers listed herein will be considered provided they meet the requirements of this Specification.
- .3 Sheet Steel: ASTM A653/A653M galvanized to Z180 (G60), stucco embossed surface; pre-coated with silicone polyester finish.

- .4 Steel perforated grille ventilation insert.
- .5 Insulation: Foam-type polyurethane core; nominal RSI-2.8 (R-16) thermal value.
- .6 Metal Primer Paint: Zinc chromate

## **2.2 PANEL CONSTRUCTION**

- .1 Panels: Steel construction; outer steel sheet of 0.91 mm (20 gauge) thickness, flush - no ribs profile; inner steel sheet of 0.46 mm (26 gauge) thickness, flush - no ribs profile; continuous sheet steel reinforcement strips, 32 mm (1-1/4 inch) wide by 0.91 mm (20 gauge) thick mounted top and bottom for hinge mounting, tongue and groove weather joints at meeting rails; insulated.
- .2 Door Thickness: Nominal 45 mm (1-3/4 inches) thick.
- .3 Glazing: Double insulating sealed unit windows with moulded plastic (PVC) frame; nominal size 600mm x 300mm (24 x 12 inches); overall thickness 13 mm (1/2 inch). Glazed sections provided at the north and south garage doors.

## **2.3 DOOR HARDWARE COMPONENTS**

- .1 Track:
  - .1 Rolled galvanized steel with Z180 (G60) zinc coating designation, 2.7 mm (12 gauge) base metal thickness mounted to continuous one-piece galvanized angle, minimum 1.9 mm (14 gauge) thickness.
  - .2 Track size 75 mm (3 inch) with maximum 380 mm (15 inch) track radius.
- .2 Hinge and Roller Assemblies:
  - .1 Heavy duty double end hinges and adjustable roller holders of galvanized steel.
  - .2 Rollers: [50 mm (2 inch)] [75 mm (3 inch)] floating hardened steel bearing rollers, located at top and bottom of each panel, each side.
  - .3 Bottom Bracket: Galvanized steel, minimum 2.66 mm (12 gauge) thick with removable aluminum roller holder.
- .3 Lift Mechanism: Torsion springs fitted on 25 mm (1 inch) continuous hollow tube shaft, 1.9 mm (14 gauge) thickness, keyed and mounted on ball bearings, and supported by heavy gauge gusset plates; oil tempered with 100,000 standard cyclage.
- .4 Cable Drums: Suitable for lift type specified, with galvanized steel aircraft grade lifting cables designed to suit door weight at a safety factor of 5:1.

## 2.4 DOOR HARDWARE COMPONENTS - CORROSION PACKAGE

- .1 Track:
  - .1 Rolled steel with corrosion resistant powder coat finish, 2.7 mm (12 gauge) base metal thickness mounted to continuous one-piece powder coated angle, minimum 1.9 mm (14 gauge) thickness.
  - .2 Track size 75 mm (3 inch) with maximum 380 mm (15 inch) track radius.
- .2 Hinge and Roller Assemblies:
  - .1 Heavy duty powder coated hinges and adjustable roller holders.
  - .2 Rollers: 75 mm (3 inch) floating bearing less Nystroll nylon rollers with stainless steel shaft, located at top and bottom of each panel, each side.
  - .3 Bottom Bracket: Powder coated steel, minimum 2.66 mm (12 gauge) thick with removable aluminum roller holder.
- .3 Lift Mechanism: Galvanized torsion springs fitted on zinc-plated 25 mm (1 inch) continuous hollow tube shaft/coupler, 1.9 mm (14 gauge) thickness] [zinc-plated cold rolled solid shaft], keyed and mounted on ball bearings, and supported by heavy gauge galvanized gusset plates; oil tempered with 100,000 standard cyclage for north and south O/H doors, and 10,000 for center door.
- .4 Cable Drums: Suitable for lift type specified, with stainless steel aircraft grade lifting cables designed to suit door weight at a safety factor of 5:1.
- .5 Fasteners: Stainless steel.

## 2.5 ACCESSORIES

- .1 Sill Weatherstripping: Low temperature resilient vinyl astragal, one-piece; fitted to retainer at bottom of door panel, full length contact.
- .2 Jamb Weatherstripping: Roll formed end stile section full height of jamb, fitted with resilient weatherstripping, placed in moderate contact with door panels.
- .3 Head Weatherstripping: Low temperature, one-piece full length top retainer/seal.
- .4 Panel Joint Weatherstripping: Bulb-type, one-piece full length resilient weather seal.
- .5 Lock: Inside side mounted, adjustable keeper, spring activated latch bar with feature to retain in locked or retracted position; exterior handle; interior exit device; card reader operated and master keyed lock.



## 2.6 DOOR OPERATOR

- .1 Manufacturers: Product: Pow'Air'Dor, manufactured by Upwardor
- .2 Or approved alternate.
- .3 Corrosion resistant anodized aluminum operator with 40-50 mm (1-1/2 to 2 inch) pneumatic rod-less cylinders, sealed closed loop system with adjustable cushioning at end of cycle.
  - .1 Internally guided with only one (1) moving part; complete with mounting brackets, fittings, tubing and connecting arm.
  - .2 Slow down speed 600 mm (2 ft) from open and close limit (Model # CB).
  - .3 Trolley operator for standard lift applications (Model # T).
  - .4 Side Mount Trolley for high lift or full vertical lift applications (Model # SMT).
- .4 Operation:
  - .1 Fully automated control valve panel with directional valve, two-speed control valves, one (1) for open and one (1) for close, noise suppression muffler, FRL unit, Auto/Man selector switch, transformer 120 vac to 24 vac, timer to close, panel mount NEMA 4X pushbuttons for open/close, fittings, tubing, LED indicating lights for visual trouble shooting in NEMA 4X enclosure with clear view cover for walk by inspections.
    - .1 Reversing pressure switch to reverse door upon contact with object; safety edge on bottom of door not required.
    - .2 NEMA 4X thru beam photo eye with water proof housings for safety reverse when photo eye is obstructed.
    - .3 Emergency pneumatic panel mounted push buttons for open and close functions in the event of power failure.
    - .4 Compressor auto drain with variable timer to drain compressor of water and debris from tank.
    - .5 NEMA 4X panel-mounted push buttons for open/close.
    - .6 NEMA 4X push button station for open/close.
    - .7 3/8 ports for systems using 50 mm (2 inch) operator.
    - .8 Card reader activation for automatic open.

## 2.7 ELECTRICAL CHARACTERISTICS

- .1 Electrical Characteristics:
  - .1 Motor: 375 W (1/2 hp) rated load amperes; manually operable in case of power failure, transit speed of 300 mm (12 inches), per second. Coordinate motor with

existing site conditions

- .2 Power Supply: Coordinate with power supply on site.
- .3 Refer to electrical drawing EM-201 for requirements.
- .2 Motor: CAN/CSA-C22.2 No. 100, Type [\_\_\_\_\_] [NEMA MG1, Type [\_\_\_\_\_]].
- .3 Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to CSA-C22.1.

## **2.8 FINISHES**

- .1 Exterior Surfaces: Precoat, colour Bright White.
- .2 Interior Surfaces: Precoat, colour Bright White.
- .3 Perforated Extrusions: Painted Bright White

## **3. EXECUTION**

### **3.1 EXAMINATION**

- .1 Verify existing conditions before starting work.
- .2 Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- .3 Verify that electric power is available and of the correct characteristics.

### **3.2 PREPARATION**

- .1 Prepare opening to permit correct installation of door unit to perimeter air and vapour barrier seal.
- .2 Apply primer to wood frame.

### **3.3 INSTALLATION**

- .1 Install door unit assembly to manufacturer's written instructions.
- .2 Anchor assembly to wall construction and building framing without distortion or stress.
- .3 Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- .4 Fit and align door assembly including hardware.
- .5 Install operator including electrical motors, controller units, pushbutton stations, relays and other electrical equipment required for door operation.
- .6 Coordinate installation of electrical service. Complete power and control wiring from

disconnect to unit components.

- .7 Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07 90 00.
- .8 Install perimeter trim and closures.

### **3.4 ERECTION TOLERANCES**

- .1 Section 01 45 00: Quality Control.
- .2 Maximum Variation from Plumb: 1.5 mm (1/16 inch).
- .3 Maximum Variation from Level: 1.5 mm (1/16 inch).
- .4 Longitudinal or Diagonal Warp: Plus or minus 3 mm (1/8 inch), from 3 m (10 ft) straight edge.
- .5 Maintain dimensional tolerances and alignment with adjacent work.

### **3.5 ADJUSTING**

- .1 Lubricate and adjust door assembly to smooth operation and in full contact with weatherstripping.

### **3.6 CLEANING**

- .1 Clean doors, frames and steel perforated grille ventilation insert.
- .2 Remove temporary labels and visible markings.

### **3.7 PROTECTION OF FINISHED WORK**

- .1 Protect installed work.
- .2 Do not permit construction traffic through overhead door openings after adjustment and cleaning.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 WORK INCLUDED**

- .1 The work included in this Subcontract includes, without being limited to, the following:
  - .1 Detailed design, engineering, fabrication and installation of complete window system as shown on Drawings and as specified, all as required to meet the design criteria and Warranty provisions.

### **1.2 RELATED SECTIONS**

- .1 Section 02 06 00: Selective Demolition
- .2 Section 04 20 00: Unit Masonry
- .3 Section 05 41 00: Structural Steel Stud Framing System
- .4 Section 05 50 00: Metal Fabrications
- .5 Section 06 10 00: Carpentry
- .6 Section 07 20 00: Insulation
- .7 Section 07 21 19: Spray-in-place Urethane Foam Insulation
- .8 Section 07 27 00: Air / Vapour Barrier
- .9 Section 07 46 19: Steel Siding
- .10 Section 07 48 13: Thermally Broken Rain Screen Attachment System
- .11 Section 07 62 00: Sheet Metal Flashing and Trim
- .12 Section 07 90 00: Joint Sealants
- .13 Section 08 17 13: Entry Doors and Frames
- .14 Section 09 25 00: Gypsum Wallboard
- .15 Section 09 91 00: Painting

### **1.3 SUBMITTALS**

- .1 Submit shop drawings in accordance with section 01 33 00.
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00.
  - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets. Indicate VOC's:
    - .1 For glazing materials during application and curing.
- .3 Show details of connecting work of this Section with work of adjacent Sections.
- .4 Samples:
  - .1 Submit samples in accordance with Section 01 33 00.

- .2 Submit duplicate 300 x 300 mm size samples of each type of glass and glass assembly, and sealant material.
- .5 Indicate materials and details in scale full size for head, jamb and sill, profiles of components, interior and exterior trim, junction between combination units, elevations of unit, anchorage details, location of isolation coating, description of related components and exposed finishes, fasteners, and caulking. Indicate location of manufacturer's nameplates.
- .6 Indicate materials and support details in scale full size for the interchangeable air conditioner sashes.
- .7 Shop drawings shall be sealed by a Professional Engineer registered in the Province of Ontario.
- .8 Submit one (1) representative model of each type of window. Include frame, sash, sill, glazing and weatherproofing method, insect screens, surface finish and hardware. Show location of manufacturer's nameplates.
- .9 Upon request, obtain from window manufacturer and submit to Consultant certified copy of test data from recognized independent testing laboratory confirming performance requirements of windows.
- .10 Before commencement of work, and before any materials are delivered to job site, submit to Consultant a complete list of materials proposed for use in the Work, including identification of manufacturer and product names. Certify that, where applicable, materials meet relevant CGSB and CSA standards. Provide any certificates requested.
- .11 Upon request, submit material safety data sheets.
- .12 Obtain from entry door manufacturer and submit to Consultant operation and maintenance data for doors for incorporation into Operation and Maintenance Manual.

#### **1.4 SCHEDULE**

- .1 The installer shall allow for co-ordination between trades interfacing with the window installation and shall strictly comply with the installation schedule approved by the Owner.
- .2 Co-ordinate the work of this Subcontractor with the work of Subcontractors providing adjacent materials such as sealants, gypsum wallboard and the like.
- .3 Co-ordinate this work with interference work to ensure and maintain a complete thermal and vapour seal envelope.
- .4 Coordinate the work of this Section with installation of air barriers, thermal insulation materials and flashings.

- .5 Include schedule of installation, identifying each unit with door marks and numbers relating to numbering on Contract Drawings. Disruption to daily living of the tenants shall be kept to minimum.
- .6 Provide a minimum five (5) business days' notice to the Consultant team and client prior to installation of any door and frame.

## **1.5 REFERENCE STANDARDS**

- .1 Reference Standards outlined in this Section include:
  - .1 NAFS – AAMA/WDMA/CSA 101/I.S.2/A440-08.
  - .2 CAN/CSA-A440-00/A440.1-00 (R2005): Windows
  - .3 CAN/CSA-A440.2-04/A440.3-04
  - .4 CAN/CSA-A440.4-07
  - .5 Ontario Building Code
- .2 Glass Association of North America (GANA).
  - .1 GANA Glazing Manual (50th Anniversary Edition).
- .3 American Society for Testing and Materials International (ASTM).
  - .1 ASTM C542-05(2011), Standard Specification for Lock-Strip Gaskets.
  - .1 ASTM D2240-05(2010), Standard Test Method for Rubber Property Durometer Hardness.
- .4 Canadian General Standards Board (CGSB).
  - .1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.
  - .2 CAN/CGSB-12.8-97, Insulating Glass Units.
  - .3 CAN/CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound.

## **1.6 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Single Source Responsibility: ensure primary materials provided in this Section are obtain from 1 source by a single manufacturer and secondary materials are obtained from sources recommended by primary materials manufacturers. All windows and related components shall be by the same manufacturer.
  - .2 All windows and related accessories shall be installed by a Contractor approved by the manufacturer. Provide written evidence of approval from manufacturer, upon request.
  - .3 Installers shall have a minimum of five (5) years proven experience in the application

of the products, systems and assemblies specified herein.

- .4 Employ only fully trained and skilled workers and execute work in strict accordance with sliding doors manufacturer's requirements.
  - .5 Arrange for windows manufacturer's technical representative to attend site meeting with Contractor and Consultant prior to the commencement of the work to discuss the installation procedures and unique conditions.
- .2 Mock-ups:
- .1 Arrange with Consultant to assist in preparing a schedule fixing the date for mock-up review.
  - .2 Prepare mock-up for the Consultant's and Owner's review, promptly and in an orderly sequence, to avoid delay in the schedule of the Work.
  - .3 Failure to prepare mock-ups in ample time will not be considered sufficient reason for an extension of Contract Time and delay claims.
  - .4 Arrange with Owner's representative and Consultant to identify a location for the establishment of the mock-up representing all phases of the work. The mock-up will demonstrate the materials, duress, sequences, finishes, and general quality of the work
  - .5 Modify mock-up in accordance with the Owner and Consultant's review.
  - .6 Provide mock-up using personnel assigned to the Work, and products and techniques to be used on the Work.
  - .7 Mock-up shall serve as the standard for installation workmanship for the remaining parts of the Work.
- .3 Independent Inspection & Testing:
- .1 The Owner for the purpose of inspecting and/or testing portions of the Work may engage Independent Inspection & Testing agencies.
  - .2 During the installation, Owner may arranged for testing and inspection of the work randomly without prior notification.
  - .3 Employment of Inspection & Testing agencies does not relieve the Contractor's responsibility to perform work in accordance with the Contract Documents.
  - .4 Provide assistance required for executing Inspection & Testing by the appointed agencies.
  - .5 Allow Inspection & Testing agencies and/or Owner representative's access to the Work both on the site and at offsite manufacturing and/or fabrication plants.
  - .6 Retesting of materials that fail to comply with specified requirements shall be done at

Contractor's expense.

## **1.7 WARRANTY**

- .1 Fiberglass Material: 20 years against premature deterioration
- .2 Sealed Units: 10 years against sealed unit failure
- .3 Hardware: 5 years against malfunction
- .4 The work described in this Section shall be guaranteed against all defects and deficiencies in materials and workmanship for a ten (10) year period from the date of Substantial Performance of the Work.
- .5 Defects include, but are not limited to:
  - .1 Water leakage beyond air/vapour seal.
  - .2 Loosening of glazing and/or anchorage.
  - .3 Formation of condensation on glass or frames based on manufacturer's design parameters.
  - .4 Sealant failure.
- .6 Submit each warranty:
  - .1 Identifying the party as warrantor/guarantor.
  - .2 Issued in both the Contractor's and Owner's names.
  - .3 Including labour and materials for removal, repair and/or replacement of products provided as part of the Work and adjacent damaged materials.

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

- .1 Deliver, store and handle materials in accordance with Section 01 11 01 and with manufacturer's written instructions.
- .2 Adequately protect finishes to prevent damage thereto during fabrication, storage, shipping, handling and installation.
- .3 Store and handle glazed units on site in accordance with IGMAC recommendations.
- .4 Deliver, handle and store units by methods approved by manufacturer. Store units at site on wood platforms raised above grade or in enclosures protected from elements and corrosive materials. Stack units vertically in manner to prevent raking. Do not remove from crates or other protective covering until ready for installation.
- .5 Protection of this work shall be the responsibility of this Subcontractor.
- .6 Store window units in an upright position in a clean and dry storage area.
- .7 Provide methods for lifting or hoisting units into place without causing damage.



## **1.9 WASTE MANAGEMENT AND DISPOSAL**

- .1 Divert uninstalled materials for reuse at nearest used building materials facility or similar type facility.
- .2 Divert unused caulking and sealant materials from landfill through disposal at special wastes depot.
- .3 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.
- .4 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .5 Dispose of corrugated cardboard, polystyrene, plastic, packaging material in appropriate on-site bin for recycling in accordance with site waste management program.
- .6 Packaging Waste Management: remove for reuse and return of pallets, crates, padding and packaging materials as specified in in accordance with Section 01 74 21.

## **2. PRODUCTS**

### **2.1 WINDOWS AND FRAMES**

- .1 325 Series Casement, Awning (Open-Out) and Fixed High Profile Window assemblies, as manufactured by Inline Fiberglass Ltd., Integrity windows and doors, made with Ultrex pultruded fiberglass, as manufactured by Marvin Windows and Doors, or approved alternate. Frames are 82.5mm (3-1/4") deep and tested in compliance with NAFS – AAMA/WDMA/CSA 101/I.S.2/A440-08 and CSA A440 S1-09 CAN SUPPLEMENT SECTION 5.
- .2 For windows and frames adjacent to sliding doors (Inline 600 series) at the back of the townhouse units: 400 Series Casement, Awning (Open-Out) and Fixed High Profile Window assemblies, as manufactured by Inline Fiberglass Ltd., Integrity windows and doors, made with Ultrex pultruded fiberglass, as manufactured by Marvin Windows and Doors, or approved alternate. Frames are 98.4mm (3-7/8") deep and tested in compliance with NAFS – AAMA/WDMA/CSA 101/I.S.2/A440-08 and CSA A440 S1-09 CAN SUPPLEMENT SECTION 5.
- .3 Window Air Conditioning accommodation: provide interchangeable sash:
  - .1 Fibreglass pultrusions by Inline Fiberglass, Integrity windows and doors, made with Ultrex pultruded fiberglass, as manufactured by Marvin Windows and Doors, or approved alternate.
  - .2 Glazing sash, similar to fixed window complete with hardware and key. Sash is removable by Alan key tool, provide keys for superintendent. Glazing is to be 22mm

- (7/8") or 35mm (1 3/8") deep. Glass thickness shall be in accordance with IGMA's recommended thickness requirements. Tempered safety glass, double glazed, and Low-E coated, Argon gas Filled and Warm Edge Spacers.
- .3 A/C panel with base tray support. Provide pre-cut insulated metal panel, dimension is to be confirmed to accommodate standard window A/C unit. Lockable in place, provide hardware and keys as per or similar to above description. Base tray support is to be made of prefinished metal suitable to support window A/C unit load, complete with drainage fold. Provide PEO stamped drawing to confirm its suitability to carry the A/C unit load. Provide all of the support as required. All hardware and materials shall be of non-corrosive, suitable for exterior application.
  - .4 For each townhouse unit, provide Window Air Conditioning accommodation unit, both sashes: glazing and A/C panel with base support. Refer to Drawings, Door and Window Schedule, and Elevation. Each townhouse unit will have up to 3 units of Window Air Conditioning accommodation unit
  - .5 In addition, provide three (3) each extra Window Air Conditioning accommodation unit, both sashes: glazing and A/C panel with base support.
  - .6 Provide mock-up, which may be part of the final work.

## **2.2 PERFORMANCE CRITERIA**

- .1 Based on CAN/CSA Standard A440-00/A440.1-00 (R2005), the energy star rated operating windows shall comply with the following minimum criteria:
  - .1 Air Tightness: ASTM E283: A3
  - .2 Water Tightness: ASTM E547: B5
  - .3 Wind Load Resistance: ASTM E330: C5
  - .4 Thermal Performance: ER = -5
  - .5 Condensation Index: 55
  - .6 Sash Strength and Stiffness: No failure or permanent deformation.
  - .7 Ease of Operation: Fc = 40 N or less  
Fm = 20 N or less
  - .8 Sash Pull-off: Pass
  - .9 Screen Strength: S1
- .2 Based on CAN/CSA Standard A440-00/A440.1-00 (R2005), the fixed windows (Inline series 325, or approved alternate) shall comply with the following minimum criteria:
  - .1 Air Tightness: ASTM E283: Fixed

- .2 Water Tightness: ASTM E547: B7
- .3 Wind Load Resistance : ASTM E330: C5
- .3 Based on CAN/CSA Standard A440-00/A440.1-00 (R2005), the fixed windows (Inline series 400, or approved alternate) shall comply with the following minimum criteria:
  - .1 Air Tightness: ASTM E283: A3
  - .2 Water Tightness: ASTM E547: B7
  - .3 Wind Load Resistance : ASTM E330: C4

### **2.3 FIELD MEASUREMENTS**

- .1 Site measure all rough window openings in relation to pre-fabricated windows to ensure achievement of specified tolerances.
- .2 All site measurements must be conveyed to General Contractor and agreed upon for coordination and preparation of openings.
- .3 Immediately report any discrepancies to Consultant.

### **2.4 AIR/VAPOUR SEAL MEMBRANE**

- .1 Provide window frames with site installed air/vapour seal membrane materials to achieve continuous air seal around window frame perimeters to adjacent wall system.
- .2 Install air/vapour seal membrane as specified in Section 07 19 60.
- .3 Air/vapour seal membrane materials shall be compatible with window frame materials.

### **2.5 WINDOW ANCHORS**

- .1 Material: stainless steel, 304 grade.
- .2 Thickness: As required by manufacturer's engineering analysis.
- .3 Provide continuously around window, mitre and seal corners.

### **2.6 METAL FLASHING**

- .1 Metal sill and head flashings as specified in Section 07 62 00.

### **2.7 ACCESSORIES AND TRIM**

- .1 Frame Extensions: Provide factory installed steel jamb, sill and head extensions on all exterior and interior mouldings and trim as required to suit existing wall thickness as indicated or required.
- .2 Provide steel sill on the exterior: top, bottom, and both sides. Colour to match fibreglass

- window frame.
- .3 Provide interior enclosure on the interior: top, bottom, and both sides. Enclosure to be stained maple wood.
  - .4 Screens: Factory installed on all operating units. Black mesh fiberglass screen cloth set in aluminum frame with an 18x16- mesh count. Colour to Owner's selection. Mount screens for interior replacement.
  - .5 Assembly screws: Corrosion resistance equal to or greater than stainless steel 300 series.
  - .6 Frame sealants: Type as recommended by frame manufacturer.
  - .7 Provide Casing on all 4 sides of windows: painted pine.

## **2.8 MATERIALS**

- .1 All frames and sash profiles are made from Pultruded Fiberglass, having nominal wall thickness of 2.3mm (0.090") with minimum fiber glass content of 60%. Non-structural accessory members are permitted to be in vinyl or aluminum and are identified as such. If required, Brickmold to be aluminum factory installed.
- .2 All materials used in conjunction with one another must be compatible.

## **2.9 FINISHES**

- .1 All exposed surfaces are coated with durable acrylic urethane top coat with a medium Gloss of 17-35. In compliance with AAMA-323. Provide full range of standard colour sample for Consultant's approval.

## **2.10 HARDWARE**

- .1 Concealed Stainless Steel Hinges, Roto Gear Operators. Multi-point locks, metal Cams locks, or approved alternate. Hardware is fastened into patented reinforcements. Optional limiting devices where specified or as per Ontario Building Code requirements.
- .2 Finishes: Electrostatically painted enamel. Colour to Owner's selection.

## **2.11 WEATHERSTRIPPING**

- .1 Design shall utilize twin compression EPDM seals. Frames shall have a bulb seal and the sash shall use a combination bulb and foot seal.
- .2 Windows and their weather-stripping shall be sufficiently air tight. Demonstrate that Weatherstripping is air tight and can be replaced easily.

## **2.12 GLASS**

- .1 Design glass to CAN/CGSB-12.20-M. Perform stress analysis. Design units to accommodate live, dead, lateral, wind, seismic, handling, transportation, and erection loads.
- .2 General: All materials under Work of this Section, including but not limited to, primers, coatings, sealers, sealants, adhesives and cleaners are to have low VOC content limits.
- .3 Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .4 Manufacturer's: Products of following manufacturers are acceptable subject to conformance to requirements of drawings, schedules and specifications:
  - .1 AGC Flat Glass North America, Ltd.: [www.na.agc-flatglass.com](http://www.na.agc-flatglass.com)
  - .2 Guardian Industries Corp.: [www.guardian.com](http://www.guardian.com)
  - .3 McGrory Glass: [www.mcgrory.com](http://www.mcgrory.com)
  - .4 Pilkington Special Glass Limited: [www.pilkington.com](http://www.pilkington.com)
  - .5 PPG Canada Inc.: [www.ppgglass.com](http://www.ppgglass.com)
  - .6 Schott North America Inc.: [www.us.schott.com](http://www.us.schott.com)
  - .7 Trulite Industries Limited: [www.trulite.com](http://www.trulite.com)
  - .8 Viracon: [www.viracon.com](http://www.viracon.com)
  - .9 TGP: [www.fireglass.com](http://www.fireglass.com)
  - .10 Or approved alternate.
- .5 Limit glass deflection to flexural limit of glass with full recovery of glazing materials.
- .6 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.
- .7 Perform a thermal stress analysis on each insulating thermal unit and provide heat strengthening and/or tempered units as necessary to prevent thermal breakage.
- .8 Glass thickness shall be in accordance with IGMA's recommended thickness requirements.
- .9 Insulated Glass: Double-glazed single hung units with tempered safety glass with Low E coating filled with Argon gas and Warm Edge Spacers.
- .10 Apply heel beads to maintain air control layer between glass and frame.
- .11 Warm Edge Spacers, stainless steel: Fenzi, Cardinal XL, Helitherma, or approved alternate.

- .12 Tempered safety glass: to ASTM C1048, Kind FT or CAN/CGSB-12.1-M, Type 1-tempered, Class B, clear, minimum 6 mm thick.
  - .1 For use at insulating glass units of exterior doors, and additional areas as required.
- .13 Setting blocks: neoprene, Shore "A" 80 durometer hardness to ASTM D2240, 100mm x 6mm x width to suit glass.
- .14 Glazing tape: preformed butyl with continuous spacer, Shore "A" 10-15 durometer hardness, paper release, black colour, 3 x 9.5 mm.
- .15 Glazing Seal:
  - .1 Primary seal: polyisobutylene.
  - .2 Secondary seal: silicone, provide manufacturer's letter confirming compatibility, and show compatibility test result.
- .16 Gasket: black neoprene to ASTM C542, "U" cavity type with lock strip.
- .17 Sealant: multicomponent, chemical curing to CAN/CGSB-19.24-M, Type 2, Class A.
- .18 Insulating glass unit (Typical): Type 3 to CAN/CGSB- 12.8, factory-sealed, double glazing units, outer and inner pane of clear, 6 mm tempered glass separated by 12.7 mm.
- .19 Security Film:
  - .1 Provide security film conforming to ULC S332, clear, 3 ply polyester film capable to withstand 2400 kPa (350 psi) breaking strength, having tensile strength of 193 MPa (28000 psi) when applied on glazing system.
  - .2 Security Sealant: ASTM C920, provide security sealant bead around perimeter; type shall be compatible with security as recommended by film manufacturer.
  - .3 Security Film by ACE Security Film, "300 Series", or 3M Scotchshield Safety Security Film SH14CLARL or approved alternate.

### **2.13 GLAZING METHOD**

- .1 Laid-in glazing using shimmed butyl tape on the exterior and interior non-structural glazing stop to lock in sealed units for secure and positive seal.
- .2 Verify that openings for glazing are correctly sized and within tolerance.
- .3 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

### **2.14 GLAZING SCHEDULE**

- .1 Glazing types:
  - .1 Glass Type: insulating glass units consisting of clear tempered safety glass, double

glazed single hung, low-e coating, Argon gas filled and warm edge spacers. For use at exterior windows.

- .2 Comply with CAN/CGSB-12.8-M and IGMA requirements utilizing approved non-metallic PVC or Fibreglass warm edge spacer in black colour. Dual seal with a PIB primary seal and silicone secondary seal.
- .3 Argon gas fill: 100% pure. Argon gas to be used to fill air space at all insulated glass units, minimum 95%.
- .4 Low-E coating:
  - .1 High performance sputtered low-E coating: 'PPG Industries Solarban 60', 'AFG Glass's Comfort ESN', 'Energy Select 40' clear by AGC Inc., or approved alternate.
  - .2 Provide insulating glass units with low-E coating edge deletion and low-E coating.
  - .3 Apply low E coating to second surface unless otherwise indicated.
- .5 Performance requirement of IGU units: Double insulated glazing units (typical):
  - .1 Total U-Value 0.25.
  - .2 Visual Light Transmittance of 69% or greater.
  - .3 Solar Heat Gain Coefficient (SHGC) of 0.39 or less.
- .6 Acceptable IGU manufacturers: Trulite, Saand, Triple Seal, Pro Glass, Prelco and MLC Glass, or approved alternate.

## **2.15 WINDOW INSULATION**

- .1 Fibreglass AF545, Roxul RXL40, or approved alternate
- .2 Fill all voids within window/flashing cavities with insulation in accordance with manufacturer's recommendations.

## **2.16 FRAMING AND ANCHORAGE**

- .1 In accordance with window manufacturer's recommendations, design and provide framing, blocking, anchors, shims and reinforcing required for the connection and positioning of the work of this Section to the structure.
- .2 In accordance with window manufacturer's recommendations, design and supply anchorage required for the connection and positioning of the work of this Section to the structure.
- .3 In accordance with window manufacturer's recommendations, design and provide a complete anchorage system required for the connection and positioning of the work of this Section to the structure.

- .4 In accordance with window manufacturer's recommendations, design framing system, fastening and anchoring to accommodate building deflection and construction tolerances.

## **2.17 DESIGN REQUIREMENTS**

- .1 Design the work of this Section:
  - .1 To accommodate unrestricted thermal movement of materials in components and connections within the temperature range of - 35° C to +40° C.
  - .2 With glazing cavities pressure equalized to exterior.
  - .3 With continuous internal water drainage paths to the exterior. Do not drain into wall cavities.
  - .4 With fastening and anchoring of the framing system to accommodate structural deflection and construction tolerances.
  - .5 To conceal interconnecting members and fastenings in the completed assembly.
  - .6 With additional concealed reinforcement if required.
  - .7 To isolate dissimilar metals preventing galvanic corrosion.
  - .8 With expansion joints designed for weather and airseal tightness and to withstand performance criteria air pressures.
- .2 Design the air seal systems for the work of this Section:
  - .1 To be continuous across the window airseal membrane, the frame, the glazing perimeter airseal and the inner insulating glass unit glazing pane.
  - .2 To accommodate movement resulting from thermal movement and structural deflection.
  - .3 To accommodate design wind loading.
- .3 Furnishing of all labour, materials, equipment and services necessary for the replacement of the existing unit exterior windows and frames with new energy star rated doors and frames and related materials to the full extent of the drawings and as specified herein.
- .4 Protect and/or repair as necessary all materials adjacent to, or affected by, the work of this Section.
- .5 Anytime a door or window is removed, it must be replaced before the end of the work day. Temporary overnight protection of openings with plywood or tarps will not be permitted.
- .6 Patch and make good any damage to all existing condition and to any damage surface adjoining demolition works. Where Work involves interior space, such as doors and windows installation, paint the entire wall where Work is located. Colour is to be as per



TCHC standard.

## 2.18 FABRICATION

### .1 Members:

- .1 Fabricate generally to dimensions and profiles indicated on reviewed shop drawings and to meet specified requirements. Determine window dimensions from site measurements. Maintain site lines indicated and clearances to other construction components.
- .2 Reinforce members for attachment of hardware.
- .3 Ensure that glazing rabbet is provided with depth and width to accommodate specified glass units.
- .4 Maintain a minimum clearance of 6 mm and a maximum clearance of 13 mm between the window frame and the rough opening.

### .2 Assembly of Units:

- .1 Join members by welding where practical, using materials recommended by manufacturers of metals being welded. Remove flux completely following welding, and grind and polish joints smooth and clean.
- .2 Join members where welding is impractical by mechanical methods. Reinforcement or fasteners visible on exposed faces of members when window is closed will not be acceptable.
- .3 Incorporate weepholes to drain off pocketed water. Baffle to prevent entry of driven water to conform to specified performance.
- .4 Except where shipping makes impossible, fabricate units in shop and ship completely assembled with operating hardware attached.

### .3 Fastenings:

- .1 Use stainless steel.

## 2.19 EXAMINATION

- .1 Verify condition and dimensions of previously installed Work upon which this Section depends. Report defects to the Consultant. Commencement of Work means acceptance of existing conditions. When existing damage is discovered, provide dated and stamped photograph to the Consultant. General contractor shall any damage discovered.
- .2 Verify that substrate openings and surfaces are ready to receive work and opening dimensions are as instructed by manufacturer.

- .3 Verify wall openings and adjoining air and vapour seal materials are ready to receive work of this Section.

## **2.20 PREPARATION**

- .1 Co-ordinate dimensions, tolerances, and method of attachment with other work.
- .2 Supply anchorage devices and inserts to the appropriate Sections where required for building in or casting-in-place and instruct as to proper location and position.
- .3 Remove dust and other loose material from openings.
- .4 Clean contact surfaces with solvent and wipe dry.
- .5 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .6 Prime surfaces scheduled to receive sealant.

## **2.21 INSTALLATION**

- .1 Install windows in accordance with manufacturer's instructions and most recent version of CSA A440 installation guide, complete with necessary reinforcing and incidental components.
- .2 Install frames, screens, windows and hardware plumb, square and level in accordance with manufacturer's instructions and templates.
- .3 Include anchors and fastenings necessary to anchor work to other Trade Contractor work. Supply items and inserts required to be built into work. Secure anchorages and connections to adjacent construction. Provide instructions and verify proper positioning.
- .4 Accurately fit and frame together units and provide flush hairline joints with connections made watertight.
- .5 Ensure adequate clearance and shim space at perimeter of openings.
- .6 Inject foam insulation between window frames and adjacent construction to provide air and vapour seal.
- .7 Fasten the windows with strap anchors or through frame to ensure rigidity.
- .8 Ensure no fasteners compromise the watertightness of the frame elements.
- .9 Seal joints between frame members and other non-operating components with sealant to provide weathertight seal at outside and air vapour seal at inside.
- .10 Patch and make good any damage on the existing exterior and interior elements.
- .11 The interior wall where Work has occurred shall be painted in its entirety. Colour is to be as per TCHC standard and direction.

### **3. EXECUTION**

#### **3.1 CONVEYANCE**

- .1 Submit detailed proposed method of accessing site including transportation and hoisting of window units.
- .2 Method of accessing site shall be to approval of Owner.
- .3 Scaffolding:
  - .1 Provide scaffolding.
  - .2 Prior to design/erection of scaffolding, determine loading requirements.
- .4 Hoisting:
  - .1 Provide, operate and maintain lifting equipment required for installation of the window units.
  - .2 Qualified operators shall operate hoists.
  - .3 Locations and means for securing chain blocks, hoists or similar hoisting equipment to building structure shall be approved by Owner. Repair any damage for such activity at Contractor's expense.
  - .4 Hoisting of materials over roofs shall not be permitted.

#### **3.2 STORAGE**

- .1 Window units will be stored on site to Owner's approval.

#### **3.3 EXAMINATION**

- .1 Before installation, take critical site measurements to verify dimensions, tolerances, and method of attachment with other work.
- .2 Before installation, verify that wall openings for windows are correctly sized and within tolerance.
- .3 Verify wall openings and adjoining air and vapour barrier materials are ready to receive work of this Section.
- .4 Beginning of installation means acceptance of existing conditions.

#### **3.4 REMOVAL AND PREPARATION**

- .1 Remove and dispose of all existing operable and fixed glazing windows. Remove window units in a manner that does not damage adjacent wall components or surfaces.
- .2 Inform Consultant of any unusual or deteriorated conditions revealed during window removal. Allow Consultant to review conditions prior to covering.

### **3.5 WINDOW INSTALLATION**

- .1 Environmental Requirements:
  - .1 Install glazing when ambient temperature is 10°C minimum. Maintain ventilated environment for 24 hours after application.
  - .2 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.
- .2 Review shop drawings and install windows in strict accordance with manufacturer's instructions and the requirements of CAN/CSA-A440.
- .3 Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- .4 Erect work of this Section true and plumb, free of warp or twist, and securely fasten in place with window anchors shown on shop drawings.
- .5 Provide thermal isolation where components penetrate or disrupt insulation materials.
- .6 Provide all accessories including trim, drips and closures.
- .7 Arrange components to prevent abrupt variation in colour.
- .8 Install metal sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces.
- .9 Measure and cut sills to fit window openings.
- .10 Coordinate attachment and seal of perimeter air barrier and vapour barrier materials.
- .11 Install thermal insulation materials around perimeter of windows in accordance with manufacturer's instructions to provide continuity of thermal insulation as shown and/or specified.
- .12 Do not use expansive foam sealant unless acceptable to window manufacturer.
- .13 Paint back surfaces of unfinished aluminum that will be in contact with masonry, bedding mortar, wood, concrete, drywall or dissimilar metals with grey bituminous paint.
- .14 Remove all visible labels.

### **3.6 PROTECTION OF WORK**

- .1 Prevent overloading of any part of the Work or building.
- .2 Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of Consultant.
- .3 Protect finished work from damage during construction.
- .4 After installation, mark each light with an "X" by using removable plastic tape or paste.
  - .1 Do not mark heat absorbing or reflective glass units.

- .5 Repair damage to adjacent materials caused by window and glazing installation.

### **3.7 CLEANING**

- .1 Adjust doors for smooth and balanced window movement.
- .2 Clean windows, frames and screens.
- .3 Remove as work progresses, all corrosive and foreign materials which may set or become difficult to remove at time of final cleaning or which may damage members.
- .4 Select, apply and maintain cleaning and protective methods to ensure finishes will not become uneven or impaired as a result of unequal exposure to light and weathering conditions.
- .5 Storage of debris will not be allowed overnight.
- .6 Remove protective material from vinyl and glass surfaces.
- .7 Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- .8 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.
- .9 Clean and polish glass on the exterior and interior and remove markings indicating the presence of glass.
- .10 Perform final cleaning after completion of entire installation when so directed by the Contractor.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 RELATED SECTIONS**

- .1 Section 02 06 00: Selective Demolition
- .2 Section 08 17 13: Entry Doors and Frames.
- .3 Section 08 42 00: Fibreglass Window
- .4 Section 09 25 00: Gypsum Wallboard
- .5 Section 09 91 00: Painting

### **1.2 REFERENCES**

- .1 American National Standards Institute (ANSI)/ Builders Hardware Manufacturers Association (BHMA):
  - .1 ANSI/BHMA A156.4-2008, Door Controls - Closers.
  - .2 ANSI/BHMA A156.5-2010, Cylinders and Input Devices for Locks.
  - .3 ANSI/BHMA A156.6-2010, Architectural Door Trim.
  - .4 ANSI/BHMA A156.8-2010, Door Controls - Overhead Stops and Holders.
  - .5 ANSI/BHMA A156.13-2002, American National Standard for Mortise Locks and Latches Series 1000.
  - .6 ANSI/BHMA A156.16-2008, Auxiliary Hardware.
  - .7 ANSI/BHMA A156.21 - 2009, Thresholds.
  - .8 ANSI/BHMA A156.26 - 2006, American National Standard for Continuous Hinges.
  - .9 ANSI/BHMA A156.30-2003, American National Standard for High Security Cylinders.
    - .1 CSA International
  - .10 CAN/CSA B651-04(R2010), Accessible Design for the Built Environment.
  - .11 Door Hardware Institute:
    - .1 Architectural Door and Hardware Schedules and Specifications, 1983.
    - .2 Sequence and Format for the Hardware Schedule, June, 1984.

### **1.3 SUBMITTALS**

- .1 Submit submittals in accordance with Section 01 33 00.
- .2 Product Data:
  - .1 Submit one copy of product data sheets in accordance with Sections 01 33 00 and 01 77 00.
  - .2 Product data sheets shall consist of catalogue cuts, manufacturer's name and number,

finish and reference identification to specified standard.

.3 Samples:

- .1 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.
- .2 After approval samples will be returned for incorporation in Work.

.4 Hardware List:

- .1 Submit contract hardware list prepared by a Certified Architectural Hardware Consultant, and in accordance with Section 01 33 00.
  - .2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.
- .5 Schematic diagrams: Submit schematic diagrams of electrical components for inclusion in maintenance manual specified in Sections 01 33 00.
- .6 Manufacturer's Instructions: submit manufacturer's installation instructions.
- .7 Certificates: provide product manufacturer certificates certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .8 Closeout Submittals:
- .1 Provide operation and maintenance data for door closers, locksets, door holders, electrified hardware and fire exit hardware for incorporation into manual specified in Section 01 33 00.
  - .2 Conduct briefing of maintenance staff regarding proper care, cleaning, and general maintenance.

#### **1.4 DEFINITIONS**

.1 Master Key (MK):

- .1 A key which operates all the master keyed locks or cylinders in a group, each lock or cylinder usually operated by its own change key.
- .2 To combine a group of locks or cylinders such that each is operated by its own key as well as by a master key for the entire group.

.2 Master Key System:

- .1 Any keying arrangement which has two or more levels of keying.
  - .2 A keying arrangement which has exactly two levels of keying.
- .3 Grand Master Key System: A master key system which has exactly three levels of keying.
- .4 Great Grand Master Key (GGMK): The key which operates two or more separate groups of locks, which are each operated by a different grand master key.

- .5 Great Grand Master Key System: A master key system which has exactly four levels of keying.
- .6 Top Master Key (TMK): The highest level master key in a master key system.

## **1.5 QUALITY ASSURANCE**

- .1 Use abbreviations and symbols recommended in "Abbreviations and Symbols as used in Architectural Door and Hardware Schedules and Specifications", published by the Door and Hardware Institute.
- .2 Use hardware schedule format recommended in "Sequence and Format for the Hardware Schedule", published by the Door and Hardware Institute.
- .3 Regulatory Requirements: hardware for doors in fire separations and exit doors shall be certified by a Canadian Certification Organization accredited by Standards Council of Canada.

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

- .1 Deliver, store and handle materials in accordance with Section 01 11 01 and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Package items of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .4 Storage and Handling Requirements:
  - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect door hardware from nicks, scratches, and blemishes.
  - .3 Protect prefinished surfaces with wrapping.
  - .4 Replace defective or damaged materials with new.

## **1.7 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse, recycling, composting and anaerobic digestion in accordance with Section 01 74 21.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Dispose of corrugated cardboard, polystyrene plastic packaging material in appropriate on-



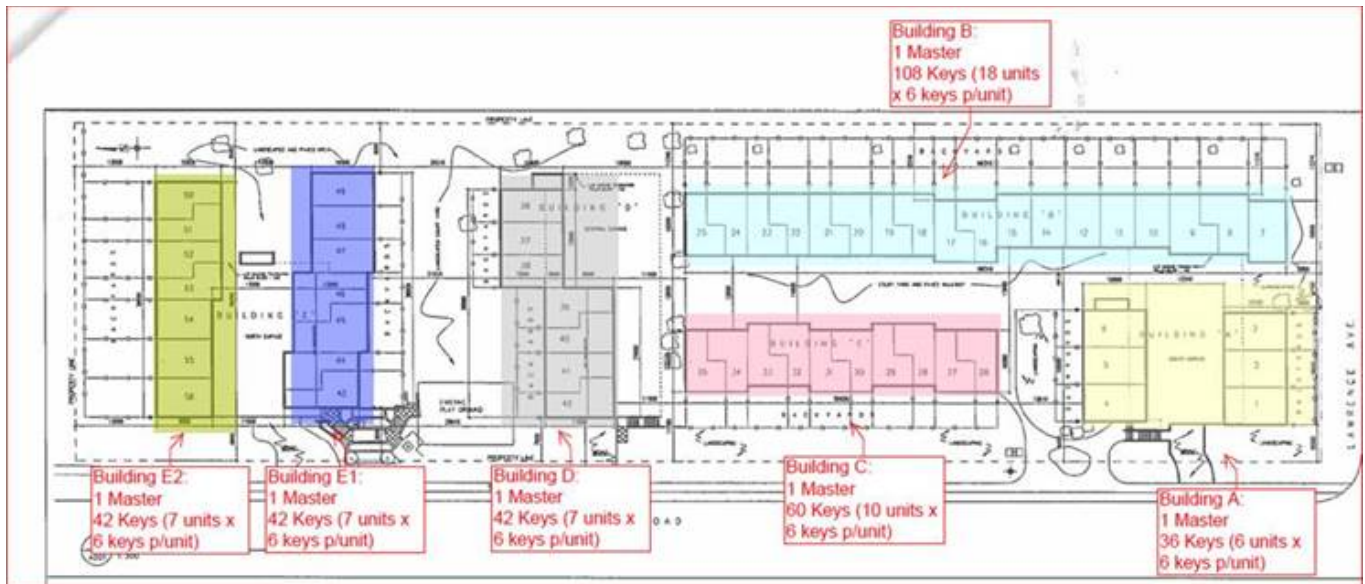
site bin for recycling in accordance with site waste management program.

## 2. PRODUCTS

### 2.1 KEYING, ACCESSORIES AND FINISH

- .1 Keying systems comply to:
  - .1 ANSI/BHMA-A156.30.
  - .2 ANSI/BHMA-A156.5, Auxiliary Locks, Grade 2.
- .2 Underwriters Laboratories (UL and CUL) listed for use on 3 hour fire doors when used in conjunction with a rated primary latching device.
- .3 Provide accessories with hardware.
  - .1 Housing – Two-piece housing, with free spinning outer ring to prevent wrenching. Concealed mounting screws standard on double cylinder functions.
  - .2 Thru-bolting – supplied with two 1/4" (6.35mm) steel thru-bolts.
  - .3 Deadbolt – 1" (25.40mm) throw, solid steel deadbolt with hardened, free spinning, steel pin insert.
  - .4 Backset – 2-3/8" (60.32mm) to 2-3/4" (69.85mm).
  - .5 Deadbolt Fronts – 2-1/4" (57.15mm) x 1" (25.40mm), to 2-1/4" (57.15mm) x 1-1/8" (28.57mm).
  - .6 Doors – coordinate with Doors and Frames.
  - .7 Supply suitable strikes for fibreglass door.
  - .8 Handing – All functions are reversible.
  - .9 Cylinder, Standard – Solid brass, Arrow "A" keyway, drilled for 6 pins, pinned to 5. E41 and E42 low profile deadbolts are supplied with 5-pin cylinders. Supplied with two brass keys. In Schlage CS keyway and other competitive keyways.
  - .10 Cylinder Options – to accept 6 pin, small format, interchangeable cores.
- .4 626 finish (satin chrome plated on brass) unless noted otherwise.
- .5 Finish fasteners to match the exposed surface on which they appear.
- .6 Provide temporary construction keying.
- .7 Use lock and latch sets with solid metal, U shape, lever handles meeting requirements of CAN/CSA-B651, Accessible Design for the Built Environment, unless specified otherwise.
- .8 Provide lever handles of same style for bored and mortise locksets.
- .9 See below diagram, in total the Development will have:
  - .1 1 Grand Master Key (2 copies).

- .2 6 master keys (one per block), 3 copies of each master keys.
- .3 330 Unit Keys (4 keys for tenants + 2 for Superintendent – total of 6 keys per unit).



## 2.2 MATERIALS

- .1 Cylinders, keyways: Acceptable Manufacturer:
  - 1. Arrow Model E-71 Deadbolt, or approved alternate.
  - 2. Master Key controlled.
  - 3. Interchangeable Core (IC), Small Format.
  - 4. 6-Pin for all of Units on site.
  - 5. Additional Cores for Move Out and Rotations.
  - 6. Deadbolt Bodies for Site Stock.
- .2 Hinges and strikes: to ANSI/BHMA-A156.1 Grade 1, Stainless Steel for exterior application, with non-removable pin, heavy duty hinges. Acceptable manufacturers are as follows: Von Duprin., Folger Adam, ASSA Abloy, Hess, Dorex, or approved alternate.
  - .1 Hinge is a Stainless steel HD 4 x 4 with ball bearings.
  - .2 Adjustable strike plates are factory installed and are stainless steel
  - .3 A strike is installed for both the latch and deadbolt.
  - .4 Multi-point hardware, strike plates are mortised into frame and come in finish to match handle set.
- .3 Threshold:

- .1 Comply with ANSI/BHMA-A156.21.
- .2 Provide thermally broken extruded aluminum thresholds for hollow metal and aluminum doors, approximately 6 mm high and conforming to barrier free requirements.
- .4 Weatherstripping: non-rigid, extruded vinyl chloride polymer or copolymer bulb or strip in aluminum strip at head and jamb, fixed, full perimeter, double weatherstrip. Weatherstrip shall be able to be easily replaced.
  1. Polyurethane foam compression weather-strip on door jambs and header.
  2. Inswing application, double bulb PVC sweep, mounted into double slot in bottom of panel, sealant between panel and sweep as required.
  3. Outswing application, no sweep is installed, a weatherstrip is installed into the sill to allow the bottom of the panel to compress against and seal.
- .5 Passage Set: Lever style, sized to suit new doors, "Elegance Series" as manufactured by Dorex, finish as selected by Architect, or approved alternate.
- .6 Weather Seal: Door frame shall be fabricated with a vinyl wrapped foam filled compression-design weather seal that is "kerf" installed. Corner seals shall be installed to the rabbet section of the door frame at the bottom of the hinge and lock jamb. Door bottom sweep shall be sealed and securely attached to the door.
- .7 Single doors shall come with 3 latches that extend into the side jamb, plus deadbolt latch.
- .8 Deadbolts: "Elegance Series" as manufactured by Dorex, as selected by Architect, or approved alternate.
- .9 Optional limiting devices where specified or as per Ontario Building Code requirements.
- .10 Assembly screws: Corrosion resistance equal to or greater than stainless steel 300 series.
- .11 Unit Door Number: Provide unit door numbers on all entry doors, front and back. Material is to be brushed stainless steel, 150mm high, 64mm (0.25") thick, concealed, anti-corrosion fasteners. Unit Door numbering is to be as per existing. Provide sample for the approval of the Consultant.
- .12 Install on all front entry door, Insulated Telescopic Mail Slot: Riopel R263. Finish is to be silver / polished aluminum.
- .13 Miscellaneous Hardware: To match existing. Finish to Owner's selection.

### **3. EXECUTION**

#### **3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins,

product catalogue installation instructions, product carton installation instructions, and data sheets.

- .2 Furnish fibreglass door and frame (as required) manufacturers with complete instructions and templates for preparation of their work to receive hardware.
- .3 Furnish manufacturers' instructions for proper installation of each hardware component.

### **3.2 INSTALLATION**

- .1 Mounting Heights from finished floor:
  - .1 Lockset: 1025mm to centerline of strike plate.
  - .2 Push/Pull: 1065mm.
  - .3 Deadlocks: 1200mm.

### **3.3 ADJUSTING**

- .1 Provide services of competent mechanic to inspect installation of hardware furnished under this Section and to supervise all adjustments (by the trade responsible for fixing) which are necessary to leave hardware in perfect working order.
- .2 Adjust door hardware, operators, closures and controls for optimum, smooth operating condition, and safety.
- .3 Lubricate hardware, operating equipment and other moving parts.
- .4 Adjust door hardware to provide tight fit at contact points with frames.

### **3.4 CLEANING**

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacturer's instructions.
- .3 Remove protective material from hardware items where present.

**END OF THE SECTION**

## **1. GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

1. All work of this Section to conform to the appropriate requirements of the most recent edition of the Ontario Building Code.
2. Coordinate work of this Section, and with other related Sections, to ensure satisfactory and expeditious completion of the Work.
3. Review and update all work schedules with Consultant on a regular basis.
4. Examine the Work of this, and all related, Sections to confirm the extent, location, quality, and condition prior to commencing.
5. Discontinue work during severe rain, wind, heat, cold, or other such inclement weather and monitor time lost in relation to Environment Canada daily norms. Lost time will only be considered where actual conditions exceed norms.

### **1.2 RELATED SECTIONS**

- .1 Section 02 06 00: Selective Demolition
- .2 Section 04 20 00: Unit Masonry
- .3 Section 05 41 00: Structural Steel Stud Framing System
- .4 Section 05 50 00: Metal Fabrications
- .5 Section 06 10 00: Carpentry.
- .6 Section 07 20 00: Insulation
- .7 Section 07 21 19: Spray-in-place Urethane Foam Insulation
- .8 Section 07 27 00: Air / Vapour Barrier
- .9 Section 07 42 00: Wall Panels
- .10 Section 07 46 19: Steel Siding
- .11 Section 07 48 13: Thermally Broken Rain Screen Attachment System
- .12 Section 07 52 00: Membrane Roofing - SBS
- .13 Section 07 62 00: Sheet Metal Flashing and Trim
- .14 Section 07 90 00: Joint Sealants.
- .15 Section 08 17 13: Entry Doors and Frames.
- .16 Section 08 42 00: Fibreglass Window
- .17 Section 09 91 00: Painting

### **1.3 SCHEDULE**

1. The installer shall allow for co-ordination between trades interfacing with the steel siding

installation and shall strictly comply with the installation schedule approved by the Owner.

#### **1.4 SUMMARY**

1. Work Included:
  - .1 Furnishing of all labour, materials, equipment and services necessary to reinstate and repair any interior gypsum wallboard finishes which are required to be removed or are damaged during replacement of the windows and doors as shown and/or described on the drawings and described herein.
  - .2 Install new gypsum wall board at window openings that have been moved or modified.
  - .3 Install new gypsum wall board at vent and mechanical openings that are to be closed.
  - .4 Protect and repair as necessary, all materials and finishes adjacent to, or affected by the Work of this and other related Sections.
  - .5 Match the finish and texture of the existing gypsum board surfaces.

#### **1.5 SUBMITTALS**

1. Submit samples, for review by Consultant and approval by Owner where required, of gypsum board and related materials.
2. Before work commences, verify in writing that materials submitted and approved are mutually compatible and are compatible with existing materials. Support verification with manufacturer(s) data and/or certification.
3. If a material submitted and approved is not suitable for verification and/or certification, submit alternate material for verification and certification for review by Consultant and approval by Owner.
4. Upon request, submit Material Safety Data Sheets.
5. No deviations from any of the above submittals will be permitted without the written permission of the Consultant.

#### **1.6 REFERENCES**

1. CAN/CSA-A82.27-M91 Gypsum Board.
2. CSA A82.30-M1980 Interior Furring, Lathing and Gypsum Plastering.
3. CAN/CSA-A82.31-M1980 Gypsum Board Application.

4. CAN/CGSB-51.34-M86 Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
5. ASTM A653M-08 Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

#### **1.7 QUALITY ASSURANCE**

1. Perform Work of this Section by competent workers skilled and experienced in using the specified materials.
2. Execute Work of this Section under the continuous supervision and direction of a competent person specializing in the type of work specified.
3. Arrange, and make allowance for all inspections and tests considered necessary by the Consultant. Inspections and tests may be conducted by the Consultant and/or his designated representative as approved by the Owner.
4. Conduct, and pay for, tests required to conform to the minimum requirements of the Ontario Building Code and its referenced documents. Confirm all tests and provide the results to the Consultant immediately upon availability.
5. Contractor shall specialize in this work with minimum five years documented experience.

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

1. Deliver all materials in original, unopened packaging with the manufacturer's labels intact.
2. Store packaged materials in original containers with manufacturer's seals and labels intact.
3. Store and protect all materials from precipitation, ground moisture and temperature extremes by use of weatherproof coverings and raised platforms.
4. Follow precautionary statements on product labels for storage and handling before use and make reference to applicable Material Safety Data Sheets.
5. Obtain Owner's approval of the location and extent of all on-site storage areas.
6. Co-ordinate delivery with construction schedule.
7. Protect materials from damage during handling, delivery and storage.
8. Make no delivery to site until storage areas are complete and conditions are such that no damage will occur to them while in storage and during installation.
9. Store materials in protected dry areas. Store gypsum board flat in piles with edges protected.

## **1.9 JOB SITE CONDITIONS**

1. Carry out work of this Section only when temperature is maintained and controlled in range of 10 to 21° C for at least 24 hours before installing gypsum board and is maintained or can be maintained until joint cement has dried.
2. Ensure the proper ventilation is being provided to exhaust excessive humidity from areas of gypsum board work.
3. Examine surfaces in which gypsum board is to be attached and check environmental conditions and do not commence work until surfaces and conditions are satisfactory.
4. Check to ensure that all framing is plumb, level and in true alignment prior to application of gypsum board.
5. Commencement of work will denote acceptance of conditions.

## **1.10 WARRANTY**

1. The work described in this Section shall be guaranteed against all defects in materials and workmanship for a three (3) year period from the date of Substantial Performance of the Work.
2. Submit each warranty:
  - .1 identifying the party as warrantor/guarantor.
  - .2 issued in both the Contractor's and Owner's names.
  - .3 including labour and materials necessary for removal, repair and/or replacement of defective products or originally provided as part of the Work and adjacent damages resulting from the defect.
  - .4 Promptly notify, respond to, and correct, at no expense to the Owner, any defects or deficiencies that are reported or become apparent within the Warranty period.
  - .5 Notify the Owner and Consultant, in writing, of the schedule and particulars related to the execution of the warranty work.

## **2. PRODUCTS**

### **2.1 MATERIALS**

1. Gypsum board: to CSA A82.27-M91. Unless otherwise indicated or required, 12.7 mm thick, 1200 mm wide x maximum practical length, ends cut square, edges tapered, as manufactured by CGC, or approved alternate.
2. Casing beads, corner beads, control joints and edge trim: to ASTM C1047, zinc-coated by hot-dip process, 0.5 mm core thickness, perforated flanges commercial grade



- galvanized steel with perforated flanges, one piece length per location, flanges suitable for board thickness and joint finishing.
3. Drywall furring channels: to ASTM C645, 0.5mm core thickness galvanized steel channels for screw attachment of gypsum board.
  4. Laminating compound: as recommended by manufacturer, asbestos-free.
  5. Resilient clips: 0.5mm base steel thickness galvanized steel for resilient attachment of gypsum board.
  6. Screws:
    - .1 Metal furring: to ASTM C645, self-drilling; self-tapping; case-hardened; Phillips head drywall screws with corrosion resistant finish, min. 32mm long galvanized screws as recommended by gypsum board manufacturer.
    - .2 Steel drill screws: to ASTM C1002.
    - .3 Wood framing: self-drilling; self-tapping; case hardened; Phillips head drywall screws with corrosion resistant finish; #6 x 25 mm for single thickness board fastening and #7 x 41 mm for double thickness board fastening, type as recommended by gypsum board manufacturer.
  7. Primer: Where indicated by board manufacturer, provide primer as required to achieve finishes as defined in ASTM C840.
  8. Latex Fortified Mortar for cement board: Of type recommended by cementitious board manufacturer to suit application.
  9. Joint reinforcing tape:
    - .1 Standard gypsum board: ASTM C475/C475M; 50mm wide x 0.25mm thick, perforated paper, with chamfered edges, as supplied by gypsum board manufacturer.
    - .2 Joint tape: to ASTM C475/C475M, paper or fibreglass mat joint tape as recommended by board manufacturer to suit mold resistant board.
    - .3 Cement Board: Mesh reinforcing tape recommended by cement board manufacturer.
  10. Joint cement: to ASTM C475/C475M, asbestos-free, as recommended by gypsum board manufacturer for proposed use.
  11. Sealants: in accordance with Section 07 90 00, including typical and acoustic sealants.
  12. Adhesive: to ASTM C557, as recommended by gypsum board manufacturer for proposed use.

### **3. EXECUTION**

#### **3.1 EXAMINATION**

1. Before application of gypsum board commences, ensure that all bucks, anchors, blocking and services have been installed, tested and approved; that conduits, pipes, cables and outlets are plugged, capped or covered; and that fastenings and supports installed by others are in place.
2. Ensure that all wood furring and/or framing is accurately installed and well secured.
3. Ensure that plumbing is inspected and approved by Consultant before application of gypsum board commences.

#### **3.2 INSTALLATION - GENERAL**

1. Co-operate with those installing work specified in other Sections to accommodate their work. Where work of other trades penetrate drywall construction, accurately scribe and cut openings to ensure frames and escutcheon plates which are utilized, properly cover the openings provided.
2. Framing and furring shown on drawings is schematic. Do not regard it as exact or complete. Construct work to provide adequate strength to withstand stresses imposed by use without distortion.
3. Apply gypsum board to CSA A-82.31-M91 and manufacturer's instructions.
4. Do not use powder actuated fasteners, except where specifically approved by Consultant.
5. Erect supporting and finish materials plumb, level, straight and square to adjoining surfaces; in true planes; to a tolerance of 3 mm maximum over 3600 mm; and to maintain required dimensions indicated.
6. Make allowances for thermal movement and frame to incorporate control joints where they occur in the building.
7. Install all materials with minimum number of joints. Butt joints to moderate contact and neatly align joints.
8. Provide for movement at intersections with structural members to avoid transference of loads to this work.
9. Do not support work of this Section from, nor make attachments to, ducts, pipes, conduits and support framing of work of other Sections.
10. Do not install metal trim, casing, or accessories that have been bent, dented, or otherwise deformed.
11. Install work in accordance with manufacturers' printed instructions, as applicable for

- materials incorporated in the work.
12. Securely attach trim, casings, framing and accessories.
  13. Do not cover mechanical and electrical services until they have been inspected and approved by relevant authorities having jurisdiction and by Consultant.
  14. Frame openings in gypsum board on all sides with suitable sections. Provide clearances required at built-in equipment, grilles, diffusers, access panels, lighting fixtures and other similar items, only after verification of requirements in each case.
  15. Alter furring and partition widths to accommodate concealed services where required. Consult with other trades before proceeding. Use wider studs or two rows of studs as required to conceal services. Construct miscellaneous bulkheads where required to conceal services, whether indicated on the drawings or not.

### **3.3 WALL FURRING**

1. Install wall furring for gypsum board wall finishes to CSA A82.31- M1980.
2. Install furring horizontally at 600 mm O/C. Space furring no greater than 50 mm from abutting walls, floors, ceilings and openings.
3. Secure furring to walls with fasteners spaced at 600 mm O/C alternating on opposite channel flanges. Shim to plumb and level with metal spacers, or use adjustable wall furring brackets.
4. Return furring into channels.
5. Close all exposed open ends of furred spaces with suitable metal closures.
6. Where furring is indicated clear of walls on drawings, construct framing as for metal stud partitions.
7. At external corners install corrosion resistant corner beads screwed to framing at 150 mm O/C on alternate flanges.
8. At board edges secure casing beads at 300 mm O/C at edges exposed to view; where board butts against other materials with no trim to conceal junction; at control joints; at perimeter of ceiling.
9. Incorporate expansion joints to coincide with building expansion joints and where otherwise indicated.
10. Casing beads installed tight to window frames shall be complete with self-adhesive neoprene gasket between frame and casing bead.

### **3.4 GYPSUM BOARD APPLICATION**

1. Check to ensure that all framing is plumb, level and in true alignment prior to application

- of gypsum board. Do not apply gypsum board until bucks, anchors and blocking are approved. Accurately fit and scribe as required.
2. Install gypsum wallboard to CSA A82.31-M1980.
  3. Apply gypsum board with long dimension perpendicular to supports except at stud partitions where they shall parallel studs.
  4. Back all joints with a framing member.
  5. Use maximum length boards to minimize end joints. Stagger end joints. Locate joints in ceiling where least prominently discerned.
  6. Stagger joints on opposite sides of partitions. Overlap joints of base and face layers of double layered wallboard.
  7. Fit ends and edges closely but not forced together. Cut paper on face with a knife, smooth by sanding and rubbing edges together.
  8. Fasten gypsum board to support members with screw fasteners at 300 mm O/C in the field of the board, 200 mm O/C along all edges, and no closer than 9 mm and no further than 12 mm from centre of joints.
  9. Locate fasteners opposite one another in adjacent panels. Drive fasteners to form slight depression but so as not to break paper cover.
  10. Start application on walls from corner of room and on ceilings from centre line of spaces.
  11. Unless otherwise required, install gypsum board first on walls, then on ceilings.
  12. Install gypsum board with casing bead at termination of wallboard g adjoining surfaces to provide for differential movement at internal corners.
  13. Where fire rated construction is required, the thickness, type and number of layers of board shall be governed by the rating required.

### **3.5 TAPING AND FILLING**

1. Ensure that boards are tight against framing members, fasteners are properly depressed, and adhesives have sufficiently cured.
2. All gypsum board will require taping and filling whether exposed to view or not.
3. Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and topping compound installed according to manufacturer's directions and feathered out onto panel faces.
4. Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of topping compound, feathered out onto panel faces.
5. Fill holes, screw and nail head depressions and other damaged areas with joint cement

and topping compounds to bring flush with adjacent surfaces of board so as to be not visible after finishing.

6. Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
7. Completed installation to be smooth, level or plumb, free from waves and other defects and ready for applied finish.

### **3.6 ADJUSTMENT AND PATCHING**

1. Repair all areas where gypsum board is damaged or removed for installation of new windows.
2. Make good to cutouts for services and other work; fill in defective joints, holes, and other depressions with joint compound.
3. Make good defective work and ensure that surfaces are smooth, evenly textured and within specified tolerances to receive finish treatment.
4. All work shall be to Consultant's approval.

### **3.7 PROTECTION**

1. Protect finished work against damage of any kind, and make good all damage at this Section's expense until completion of the Work.
2. Protect work of other Sections from damage due to work of this Section.
3. Make good any damage to satisfaction of Consultant.

### **3.8 CLEANING**

- .1 At the completion of the Work each day remove and properly store all debris, garbage, and excess materials. Regularly and frequently dispose of such material in an approved manner.
- .2 Upon completion of the Work, clean up all debris, excess materials, and equipment and remove from the site.
- .3 Cleaning should be in accordance with the requirements detailed in Section 01 74 00, Cleaning and Waste Management.
- .4 Remove droppings and excess joint compound from work of others and from work of this Section, before it sets.
- .5 Clean off beads, casings, and other metal trim, and leave all surfaces ready for specified finishes.

- .6 Cleaning of tools and equipment to be performed in a manner not causing any damage and in a location acceptable to the Owner.
- .7 Upon completion of the Work of this Section, leave areas affected in a condition as close to, or better than, original and as acceptable to Owner.
- .8 All drippage, or spills of sealants or primers shall be cleaned to approval of Consultant.

**END OF SECTION**

## **1. GENERAL**

### **1.1 GENERAL INSTRUCTIONS**

1. All work of this Section to conform to the appropriate requirements of the most recent edition of the Ontario Building Code.
2. Coordinate work of this Section, and with other related Sections, to ensure satisfactory and expeditious completion of the Work.
3. Review and update all work schedules with Consultant on a regular basis.
4. Examine the Work of this, and all related, Sections to confirm the extent, location, quality, and condition prior to commencing.
5. Discontinue work during severe rain, wind, heat, cold, or other such inclement weather and monitor time lost in relation to Environment Canada daily norms. Lost time will only be considered where actual conditions exceed norms.

### **1.2 RELATED SECTIONS**

- .1 Section 02 06 00: Selective Demolition
- .2 Section 04 20 00: Unit Masonry
- .3 Section 05 41 00: Structural Steel Stud Framing System
- .4 Section 05 50 00: Metal Fabrications
- .5 Section 06 10 00: Carpentry.
- .6 Section 07 27 00: Air / Vapour Barrier
- .7 Section 07 42 00: Wall Panels
- .8 Section 07 46 19: Steel Siding
- .9 Section 07 62 00: Sheet Metal Flashing and Trim
- .10 Section 07 90 00: Joint Sealants.
- .11 Section 08 17 13: Entry Doors and Frames.
- .12 Section 08 42 00: Fibreglass Window
- .13 Section 09 25 00: Gypsum Wallboard

### **1.3 SCHEDULE**

1. The installer shall allow for co-ordination between trades interfacing with the steel siding installation and shall strictly comply with the installation schedule approved by the Owner.

#### **1.4 SUMMARY**

1. Furnish all labour, materials, equipment and services necessary to perform the Work of this Section as specified.
2. Protect and repair as necessary, all materials adjacent to, or affected by this Work.
3. Paint and finish all existing interior and exterior paintable surfaces affected by the Work with the same finish.
4. Protect and/or repair as necessary all materials adjacent to, or affected by, the work of this Section.
5. Patch and make good any damage to all existing condition and to any damage surface adjoining demolition works. Where Work involves interior space, such as doors and windows installation, paint the entire wall where Work is located. Colour is to be as per TCHC standard.

#### **1.5 SUBMITTALS**

1. Before commencement of painting and finishing, and before any paint materials are delivered to job site, submit to Consultant a complete list of materials proposed for use on work, prepared by the selected paint manufacturer. Provide qualification certificates if requested.
2. Upon request, submit appropriately sized samples of each colour and finish, in required number of coats, gloss/sheen and textures, 200 mm x 300 mm, for review by Consultant and for approval by Owner. Use gypsum wallboard for paint finishes.
3. Before work commences, verify in writing that materials submitted and approved are mutually compatible and are compatible with existing materials. Support verification with manufacturer(s) data and/or certification.
4. If a material submitted and approved is not suitable for verification and/or certification, submit alternate material for verification and certification for review by Consultant and approval by Owner.
5. Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit WHMIS MSDS - Material Safety Data Sheets indicating VOC content.
6. Upon completion, submit records of products used. List products in relation to finish system and include the following:



- .1 Product name, type and use.
- .2 Manufacturer's product number.
- .3 Colour numbers.
- .4 MPI Environmentally Friendly classification system rating.
- .5 Manufacturer's Material Safety Data Sheets (MSDS).
- .6 Samples: Provide samples in accordance with Section 01 33 00.

## **1.6 SCHEDULE**

1. The applicator shall allow for co-ordination between trades and shall strictly comply with the installation dates scheduled in Division 1.
2. Prior to commencing painting and finishing, ensure that all other Sections of the Work that may adversely affect new paints or finishes are completed, adequately distanced from, or protected from, new areas during painting and finishing.
3. Do not commence painting or finishing when air or surface temperatures are, or are expected to fall, below 10° C.
4. Submit work schedule for various stages of painting involving interior space of the units to Consultant for approval. Submit schedule minimum of 48 hours in advance of proposed operations.

## **1.7 REFERENCES**

1. Environmental Protection Agency (EPA)
  - .1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).
2. The Master Painters Institute (MPI)
  - .1 Architectural Painting Specification Manual - 2014.
  - .2 Standard GPS-1-05, MPI Green Performance Standard for Painting.
3. Comply with current edition of Canadian General Standards Board (CGSB) specifications as follows:
  - .1 Primer for wood - 1-GP-84M91
  - .2 Primer for wallboard or concrete - CAN/CGSB-1.119-2000
  - .3 Primer for metal - CAN/CGSB-1.40-97, 85-GP-14M & 16M
  - .4 Alkyd type gloss enamel - CAN/CGSB-1.59-97 & 1.60-97
  - .5 Alkyd type semi-gloss enamel - CAN/CGSB-1.57-2003
  - .6 Alkyd type flat enamel - CAN/CGSB-1.135-99

- |     |   |   |                     |
|-----|---|---|---------------------|
| .7  | Alkyd type flat finish                          | - | CAN/CGSB-1.118-95   |
| .8  | Wood sealer for knots                           | - | 1-GP-126M           |
| .9  | Latex semi-gloss                                | - | CAN/CGSB-1.195-99   |
| .10 | Boiled linseed oil                              | - | CAN/CGSB-1.2-98     |
| .11 | Thinner, petroleum spirits<br>(mineral spirits) | - | CAN/CGSB-1.4-2000   |
| .12 | Varnish (interior)                              | - | CAN/CGSB-1.36-97    |
| .13 | Stain, oil, pigmented, interior<br>(Type 2)     | - | CAN/CGSB-1.145-97   |
| .14 | Primer-sealer, interior,<br>solvent type        | - | 1-GP-68Ma           |
| .15 | Block filler                                    | - | CAN/CGSB-1.188-2004 |
| .16 | Polyurethane varnish                            | - | CAN/CGSB-1.175-97   |
| .17 | Clear lacquer                                   | - | CAN/CGSB-1.150-M91  |
| .18 | Zinc-Rich Coating                               | - | CAN/CGSB-1.181-99   |
4. Society for Protective Coatings (SSPC)
- .1 Systems and Specifications, SSPC Painting Manual 2016.

## **1.8 QUALITY ASSURANCE**

1. Subject to these Specifications, paint manufacturers to be considered for the Work of this Section include:
  - .1 Benjamin-Moore
  - .2 Canadian Industries Limited
  - .3 Canadian Pittsburgh Industries
  - .4 C-I-L Paints Inc.
  - .5 Glidden Company
  - .6 Para Paints Canada Inc.
  - .7 Color Your World
2. Perform Work of this Section by qualified and experienced workers.
3. Execute Work of this Section under the supervision and direction of a competent person specializing in the Work.
4. Arrange, and make allowance for all inspections and tests considered necessary by the Consultant. The Consultant and/or his designated representative as approved by the

- Owner may conduct inspections and tests.
5. Conduct, and pay for, tests required to conform to the minimum requirements of the Ontario Building Code and its referenced documents. Confirm all tests and provide the results to the Consultant immediately upon availability.
  6. Qualifications:
    - .1 Contractor: to have a minimum of five years proven satisfactory experience. When requested, provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.
    - .2 Qualified journeypersons as defined by local jurisdiction to be engaged in painting work
    - .3 Apprentices: may be employed provided they work under direct supervision of qualified journeyperson in accordance with trade regulations.
    - .4 Conform to latest MPI requirements for exterior painting work including preparation and priming.
    - .5 Materials: in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.
    - .6 Paint materials such as linseed oil, shellac, and turpentine to be highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and to be compatible with other coating materials as required.
    - .7 Retain purchase orders, invoices and documents to prove conformance with noted MPI requirements when requested by Consultant.
    - .8 Standard of Acceptance:
      - .1 Walls: No defects visible from a distance of 1000 mm at 90 degrees to surface.
      - .2 Soffits: No defects visible from floor at 45 degrees to surface when viewed using final lighting source.
      - .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

## **1.9 PERFORMANCE REQUIREMENTS**

1. Environmental Performance Requirements:
  - .1 Green Performance in accordance with MPI Standard GPS-1.

### **1.10 INSPECTION REQUIREMENTS**

1. Interior painting and decorating work shall be inspected by a Paint Inspection Agency (inspector) acceptable to the specifying authority and local Painting Contractor's Association. Painting contractor shall notify Paint Inspection Agency a minimum of one week prior to commencement of work and provide a copy of project painting specification, plans and elevation drawings (including pertinent details) as well as a Finish Schedule.
2. Interior surfaces requiring painting shall be inspected by Paint Inspection Agency who shall notify Consultant and General Contractor in writing of defects or problems, prior to commencing painting work, or after prime coat shows defects in substrate.
3. Where "special" painting, coating or decorating system applications (i.e. elastomeric coatings) or non-MPI listed products or systems are to be used, paint or coating manufacturer shall provide as part of this work, certification of surfaces and conditions for specific paint or coating system application as well as on site supervision, inspection and approval of their paint or coating system application as required at no additional cost to Owner.

### **1.11 PRODUCT DELIVERY, STORAGE AND HANDLING**

1. Deliver all materials in original, unopened containers with the manufacturer(s)' labels intact.
2. Store and protect all materials from precipitation, ground moisture and temperature extremes by use of weatherproof coverings and raised platforms.
3. Keep stored materials covered at all times and take necessary precautions against fire.
4. Provide CO<sup>2</sup> fire extinguisher of minimum 9 kg (20 lb.) capacity in storage area.
5. Maintain storage area at a minimum temperature of 10° C.
6. Leave storage areas clean and free from evidence of occupancy on completion.
7. Obtain Owner's approval of the location and extent of all on-site storage areas.
8. Pallets of materials shall not be double stacked.
9. Follow precautionary statements on product labels for storage and handling before use and make reference to applicable Material Safety Data Sheets.
10. Remove paint materials from storage only in quantities required for same day use.
11. 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 Ontario Building Code Canada.
12. Waste Management and Disposal:
- .1 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
13. Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
14. Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
15. To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:
- .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
  - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
  - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
  - .4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
  - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
16. Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
17. Set aside and protect surplus and uncontaminated finish materials: Deliver to or arrange collection by organizations for verifiable re-use or re- manufacturing.
18. Close and seal tightly partly used sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

#### **1.12 JOB SITE CONDITIONS**

1. Prior to installation, inspect all surfaces to which the work of this Section is to be applied,

- and report in writing to the Consultant any unsatisfactory conditions that would adversely affect the work.
2. Commencement of work shall imply unconditional acceptance of all surfaces.
  3. Ensure that adequate controlled ventilation, heat and light are provided by General Contractor during application and drying period of interior work.
  4. Proceed with work only when surfaces and conditions are satisfactory for proper execution of the Work as specified.
  5. Heating, Ventilation and Lighting:
    - .1 Ventilate enclosed spaces.
    - .2 Do not perform 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, nor immediately following rain, frost, or dew. Avoid painting surfaces exposed to hot sun. Do not paint surfaces where condensation has or will form due to presence of high humidity and lack of proper ventilation.
    - .3 Where required, provide continuous ventilation for seven days after completion of application of paint.
    - .4 Co-ordinate use of existing ventilation system with Owner Consultant 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 to be provided by General Contractor.
  6. Temperature, Humidity and Substrate Moisture Content Levels:
    - .1 Unless specifically pre-approved by specifying body, Paint Inspection Agency and, 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 Relative humidity is above 85% or when dew point is less than 3°C variance between 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 maximum moisture content of 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.
- 7. Surface and Environmental Conditions:
  - .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
  - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits noted herein.
  - .3 Apply paint when previous coat of paint is dry or adequately cured.
  - .4 Apply paint finishes when conditions forecast for entire period of application fall within manufacturer's recommendations.
  - .5 Do not apply paint when:
    - .1 Temperature is expected to drop below 10 degrees C before paint has thoroughly cured.
    - .2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.
    - .3 Surface to be painted is wet, damp or frosted.
- 8. Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.
- 9. Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.
- 10. Remove paint from areas which have been exposed to freezing, excess humidity, rain,

snow or condensation. Prepare surface again and repaint.

11. Paint occupied facilities in accordance with approved schedule only. Schedule operations to approval of Consultant such that painted surfaces will have dried and cured sufficiently before occupants are affected.

### **1.13 JOB MOCK-UP**

1. If required by Consultant, provide mock-up(s) in building where so designated.
2. Apply samples of all finishes required in presence of Consultant. Apply samples using correct material, number of coats, colour, texture and degree of gloss required.
3. Maintain test areas until completion of work. Approved work in test area shall serve as a standard for similar work throughout building. Refinish work that does not match approved finishes if so directed by Consultant, at no additional cost to Owner.

### **1.14 COLOURS**

1. Review and match colours of affected Work.
2. Consultant shall have complete freedom in choice of colours for new or completely replaced work.

### **1.15 SPECIAL 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 building occupants in and about building.
5. Remove light fixtures, surface hardware on doors, and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations or provide ample protection of such items before commencement of painting. Store items and re-install after painting is completed.
6. Keep waste rags in metal drums containing water and remove from building at end of each workday or shift as required.
7. Provide metal pans, tarpaulins or other suitable coverings to protect floors and walls in areas assigned for storage and mixing of paints.



8. Provide adequate cover with tarpaulins, paper or other suitable means for protection of floors, walls and fixtures, etc., adjacent or in close proximity to surfaces to be finished.
9. Use all means necessary to protect paint materials before, during and after application and to protect installed work and materials of all other trades.
10. Post "WET PAINT" signs while work is in progress and drying. Post "NO SMOKING" signs where flammable materials are being used or stored in pedestrian and vehicle traffic areas to approval of Consultant.
11. Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
12. Make good any damages caused by failure to provide suitable protection.

#### **1.16 WARRANTY**

1. The work described in this Section shall be guaranteed against scaling, separation, debonding and material deterioration for a three (3) year period from the date of Substantial Performance of the Contract.
2. Submit each warranty:
  - .1 identifying the party as warrantor/guarantor
  - .2 issued in both the Contractor's and Owner's names
  - .3 including labour and materials for correction of defects immediately upon notification, at no additional cost, during the term of the warranty.
3. The warranty shall cover the replacement or repair of the Work of this Section resulting from faulty materials and/or workmanship.
4. Promptly correct, at no expense to the Owner, any defects or deficiencies that become apparent within the warranty period.

#### **1.17 MAINTENANCE**

1. Extra Materials:
  - .1 Submit maintenance materials in accordance with Section 01 77 00.
2. Submit one, one litre can of each type and colour of stain and finish coating. Identify colour and paint type in relation to established colour schedule and finish system.

## **2. PRODUCTS**

### **2.1 MATERIALS**

1. Paint materials listed in latest edition of MPI Approved Products List (APL) are acceptable for use on this project.
2. Paint and finishing materials shall be highest-grade first line quality of paint manufacturer.
3. Paint materials: to CGSB standards listed within this Section, unless manufacturer's highest grade first line quality paints exceed the listed standards.
4. All materials under Work of this Section, including but not limited to, primers, stains, and paints are to have low VOC content limits.
5. Paint materials for each coating formula to be products of a single manufacturer.
6. Painting equipment, thinners, cleaners, etc., shall be suitable types for purpose intended as recommended by paint manufacturer.
7. Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids, to be as follows:
  - .1 Be water-based.
  - .2 Be non-flammable.
  - .3 Be manufactured without compounds which contribute to ozone depletion in upper atmosphere.
  - .4 Be manufactured without compounds which contribute to smog in the lower atmosphere.
8. Water-borne surface coatings must be manufactured and transported in a manner that steps of processes, 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).
9. Water-borne surface coatings must not be formulated or manufactured with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
10. Water-borne surface coatings and recycled water-borne surface coatings must have flash point of 61.0 °C or greater.
11. 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.
12. Water-borne paints and stains, recycled water-borne surface coatings and water borne varnishes must meet a minimum "Environmentally Friendly" E2 rating.
13. Materials such as white lead, linseed oil, shellac, and turpentine, shall be pure and of highest quality and shall bear an identifying label on the container.
14. Paint Primer: ProMar® 200 Zero VOC Interior Latex Primer by Sherwin Williams, or as recommended by paint manufacturer.
15. Interior Paint Finish: Acrylic Latex Interior Flat, matt finish on drywall ceilings, colour to Owner's selection, minimum dry film thickness 1.2 mils, as per Sherwin William's "Emerald" or approved alternate.
16. Interior Paint Finish: Acrylic Latex Enamel, semi-gloss finish on wood surfaces, colour to Owner's selection, minimum dry film thickness 1.2 mils, as per Sherwin William's "ProClassic" or approved alternate.
17. Zinc rich primer, ready mix, to CGSB 1-GP-181M.

## **2.2 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. Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
3. Add thinner to paint manufacturer's recommendations. Do not use kerosene or organic solvents to thin water-based paints.
4. Thin paint for spraying according in accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Consultant.
5. Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

## **2.3 GLOSS AND SHEEN RATINGS**

1. Gloss level ratings of painted surfaces as selected by the Consultant.

2. Conform to gloss reflectance definitions listed in MPI Specification Manual.
3. Paint gloss: defined as sheen rating of applied paint, in accordance with following values:

Gloss Level	Units @ 60	Units @ 85
<u>Category/</u>	<u>Degrees/</u>	<u>Degrees/</u>
G1 - matte finish	0 to 5	max. 10
G2 - velvet finish	0 to 10	10 to 35
G3 – eggshell finish	10 to 25	10 to 35
G4 – satin finish	20 to 35	min. 35
G5 – semi-gloss finish	35 to 70	
G6 – gloss finish	70-85	
G7 – high gloss finish	>85	

## **2.4 INTERIOR PAINTING SYSTEMS**

1. Concrete Masonry Units: smooth block
  - .1 INT 4.2A Latex.
2. Structural Steel and Metal Fabrications:
  - .1 INT 5.1R High performance architectural latex finish.
3. Galvanized Metal: railings, misc. steel, pipes, ducts, etc.
  - .1 INT 5.3A Latex finish.
  - .2 INT 5.3B Waterborne light industrial coating.
4. Dressed Lumber: including door edges, etc.
  - .1 INT 6.3D Alkyd varnish finish (over stain).
5. Wood casing: window wood trim, etc.
  - .1 INT 6.4E Polyurethane varnish finish (over stain).
6. Gypsum Board: gypsum wallboard, drywall,
  - .1 INT 9.2A Latex finish (over latex sealer). For typical areas.
  - .2 INT 9.2F Waterborne epoxy (tile-like) finish. For wet areas.

## **2.5 EXTERIOR PAINTING SYSTEMS**

1. Structural Steel and Metal Fabrications:
  - .1 EXT 5.1D - Alkyd finish. Colour: BM 2121-10 Grey
2. Galvanized Metal: not chromate passivated
  - .1 EXT 5.3B - Alkyd finish.

### **3. EXECUTION**

#### **3.1 MANUFACTURER'S INSTRUCTIONS**

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

#### **3.2 EXAMINATION**

1. Do work only when surfaces and conditions are satisfactory for production of a first class job.

#### **3.3 EQUIPMENT**

1. Scaffolding and ladders shall be adequate for the work to be performed and shall comply with the requirements of the National Building Code, Part 8 - "Safety Measures at Construction and Demolition Sites". Scaffolding and ladders to be supported only from floor or outside grade.
2. Paint application equipment, brush or roller shall be of a type and quality best suiting the work and shall be kept clean and in a workable condition.

#### **3.4 PREPARATION**

1. Perform preparation and operations for exterior painting in accordance with MPI Maintenance Repainting Manual except where specified otherwise.
2. Apply paint materials in accordance with paint manufacturer's written application instructions.
3. 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 surface debris by wiping with dry, or clean cloths. Vacuum clean wherever necessary. Ensure that all surfaces to be finished are clean and free from machine, tool or sandpaper marks and are free from dust, dirt, grease, oil, rust or any other deleterious matter which may be detrimental to a satisfactory and acceptable finish.
  - .2 Wash surfaces with a biodegradable detergent 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. Allow sufficient drying

time and test surfaces using electronic moisture meter before commencing work.

4. Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats. Touch-up, spot prime, and apply primer, paint, or pre-treatment as soon as possible after cleaning and before deterioration occurs.
5. Report unacceptable surfaces to the Consultant before proceeding. Starting work will imply surfaces are suitable for finishing.
6. 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.
7. Do not apply paint until prepared surfaces have been accepted by Consultant.
8. Use sufficient drop clothes and protective coverings for full protection of paving, windows, walls, doors, roofs, floors, furnishings, fixtures, equipment and work not being painted.
9. 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. When discovered, remove any rust to existing surfaces, apply anti-rust prime and paint, such as at exterior fence and railings.
10. Employ only qualified trades to remove finish hardware, electric plates, light fixtures, grilles and other similar accessories; mask any that are not removable. Re-install them when paint is dry and clean them. Do not clean hardware with solvent that will remove permanent lacquer finish.
11. Test all cementitious surface substrates for moisture content before commencement of painting. Do not apply paint to surfaces when moisture content exceeds 15% as determined by an approved moisture-testing device.
12. Where necessary, fill nail holes, screw holes and other similar defects with non-shrink filler. Tint filler to match stains for stained woodwork. Wipe excess filler from surfaces before filler has set.
13. Ensure that foreign matter left on surfaces by other trades is properly removed by the trades concerned before commencing painting.
14. Prepare all drywall surfaces to CAN/CGSB-85.100-93. Fill minor cracks with plaster patching compound.

15. Prime all wood and metal surfaces to receive paint finish. Prepare all drywall surfaces to CGSB 85-GP-33M. Fill minor cracks with plaster patching compound. Prepare all wood surfaces to CGSB 85-GP-1M. Seal all knots; saps, streaks and resin patches on wood surfaces in strict accordance with manufacturer's written instructions. Wood carpentry items shall be primed as soon as they are delivered to the site.
16. Non-ferrous metals are not to be painted; chrome plated metals, fire labels or baked enameled finishes are not to be painted. All other metals shall be cleaned of rust, and galvanized surfaces neutralized before painting. Touch up steel shop primer as required.
17. Arrange to have traffic barred from areas during painting and drying periods, wherever possible.
18. Where materials specified are not suitable for a particular job application or are contrary to manufacturer's recommendations for use on a particular surface, such condition shall immediately be brought to the attention of the Consultant for clarification and instructions, and no extras will be allowed for the use of correct materials.
19. Wood Painted Surfaces to be:
  - .1 Dry, free of grease, oil and mildew, mortar and asphalt splatters. Knots and sappy spots must be sealed.
  - .2 Sanded smooth of all rough surfaces.
  - .3 Putty filled at all fastener holes and cracks.
  - .4 Sealed with specified sealant at all door and window trim joints after priming.
  - .5 Not painted during or immediately following foggy, rainy, or frosty weather; nor when the temperature is expected to go below 10° C before the coating has dried.
  - .6 Not painted while exposed directly to the hot, summer sun, nor painted during windy or threatening weather conditions.
20. Wood Previously Painted to be:
  - .1 Scraped, sanded and wirebrushed to remove all blistered, peeling and scaling paint down to a sound substrate. Spot prime exposed bare wood before applying finish coat.
  - .2 Cleaned of all heavy chalk deposits by thorough wirebrushing, sanding, or washing by high pressure cleaning, and primed.
  - .3 Prepared for finishing by having all cracks, crevices and fastener holes filled with putty.
  - .4 Washed with a strong solution of trisodium phosphate (T.S.P.) and thoroughly rinsed

with a strong stream of water.

- .5 Cleaned of mildew by scrubbing thoroughly with a solution of trisodium phosphate or other powdered detergent, and one litre 5% sodium hypochlorite (household bleach) in three litres of warm water in strict accordance with manufacturer's instructions. Do not mix ammonia with bleach.

21. Drywall Painted Surfaces to be:

- .1 Scraped and sanded to remove all blistered, peeling and scaling paint. Edges feathered smooth with adjacent surfaces by sanding.
- .2 Repaired of all damaged or defective areas by filling cracks, holes and blemished areas and sanded flush with adjacent surfaces. Spot prime with finish coating.
- .3 Cleaned of mildew by scrubbing thoroughly with a solution of trisodium phosphate or other powdered detergent, and one litre 5% sodium hypochlorite (household bleach) in three litres of warm water in strict accordance with manufacturer's instructions. Do not mix ammonia with bleach.
- .4 Dry, free of sanding dust. The joint treatment cement must be thoroughly dry.

### **3.5 WORKMANSHIP**

1. All materials shall be applied by skilled mechanics in a workmanlike manner. Thoroughly mix materials before application and apply evenly free from sags, runs, crawls and other defects.
2. Finish work shall be uniform in sheen, colour and texture.

### **3.6 APPLICATION**

1. No paint shall be applied at temperatures lower than 10°C or under dusty or other unsuitable conditions.
2. Method of paint application shall be generally by brush or roller. Spray painting will not be permitted unless otherwise approved in writing by Consultant.
3. 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
4. Use dipping, sheepskins or daubers when no other method is practical in places of difficult access and when specifically authorized by Consultant.
  5. Apply coats of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
  6. Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
  7. Sand and dust between coats to remove visible defects.
  8. Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.
  9. Finish top, bottom, edges and cut outs of doors after fitting as specified for door surfaces.
  10. Apply paint evenly, under adequate illumination, free from sags, runs, holidays, crawls and other defects.
  11. Apply each coat of proper consistency in accordance with the manufacturer's directions and brush out well to show a minimum of brush marks.
  12. Ensure each coat of paint is dry before applying following coat. Minimum drying time shall not be less than 24 hours or longer if so recommended by paint manufacturer.
  13. Do not exceed average rate of coverage recommended by paint manufacturer. Minimum dry film thickness per coat shall not be less than that recommended by manufacturer.
  14. Generally, all new surfaces shall receive one (1) coat of primer paint and a minimum of two (2) coats of finish paint. Existing painted surfaces shall be primed where repaired and shall receive a minimum of two (2) coats of finish paint.
  15. Tint secondary coat a shade lighter than final coat to differentiate between coats.
  16. Do not apply finish on surface that is not sufficiently dry.
  17. Finishes and number of coats specified are intended to cover surfaces completely. If they do not, apply further coats until complete coverage is achieved, to approval of Consultant. Patching will not be accepted.
  18. Refinish a whole guardrail panel where a portion of finish has been damaged or is unsatisfactory, due to work of this Section. Do not spot refinish. Refinishing of existing surfaces due to the Work shall terminate at nearest corner or change of material.
  19. When primer-sealer coat is dry, touch-up all visible hot spots or suction spots to ensure that they are sealed, before applying first coat.
  20. Finished work shall be uniform as to sheen, gloss, colour and texture.

21. Match colours and sheens of surfaces adjacent to those to be refinished.

### **3.7 MECHANICAL/ELECTRICAL EQUIPMENT**

1. Unless otherwise specified, paint exposed conduits, piping, hangers, duct work and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as noted otherwise.
2. Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
3. Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
4. Do not paint over nameplates.
5. Keep sprinkler heads free of paint.
6. Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.
7. Paint steel electrical light standards. Do not paint outdoor transformers and substation equipment.

### **3.8 PAINT FINISHES**

1. Formula 1: for gypsum board walls to receive paint finish apply: one (1) coat primer-sealer two (2) coats acrylic latex pearl or eggshell finish
2. Formula 2: for gypsum board soffits apply: one (1) coat primer-sealer two (2) coats acrylic latex interior flat or eggshell
3. Formula 3: for previously painted gypsum board walls apply: one (1) coats acrylic latex pearl or eggshell finish
4. Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

### **3.9 CLEANING**

- .1 At the completion of the Work each day remove and properly store all debris, garbage, and excess materials. Regularly and frequently dispose of such material in an approved manner.
- .2 Upon completion of the Work, clean up all debris, excess materials, and equipment and remove from the site.

- .3 Clean off any paint spotting or blemishes from work not intended to receive painting treatment and leave work in original condition.
- .4 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .5 Protect freshly completed surfaces from paint droppings and dust to approval of Consultant. Avoid scuffing newly applied paint.
- .6 Entirely reinstate, at this Section's own expense, any surface not intended to be painted, but soiled and attributable to this Section due to spillage, mixing of materials or any other cause, as approved by Consultant.
- .7 Cleaning should be in accordance with the requirements detailed in Section 01 74 00, Cleaning and Waste Management.
- .8 Cleaning of tools and equipment to be performed in a manner not causing any damage and in a location acceptable to the Owner.
- .9 Upon completion of the Work of this Section, leave areas affected in a condition as close to, or better than, original and as acceptable to Owner.
- .10 All drippage, or spills of sealants or primers shall be cleaned to approval of Consultant.

**END OF SECTION**