1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Requirements for the curing and finishing of concrete floors and slabs.

1.3 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:

.1 Contractor (Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.4 SUBMITTALS

.1 Wet Curing Procedures

.1 At least four weeks prior to implementation in the field, submit a detailed description of the methods and procedures which will be employed to wet cure the concrete floors and slabs.

.2 As a minimum, the procedures shall indicate:

.1 the method of curing which will be used;
.2 the type of materials which will be used;

.3 the duration of curing;
.4 for wet cure procedures describe location and number of hoses, sprinklers etc., to ensure 100% continuous coverage of the pour.

.2 Product Data
.1 Provide product data as specified in section 01 30 00, supplemented as follows:
.1 Submit three copies of the manufacturer's printed product literature, MSDS sheets, test data and application instructions for the floor sealer.

.3 Samples
.1 Provide samples as specified in section 01 30 00 supplemented as follows:
.1 Submit a 300 mm x 300 mm sample of each type of material (absorptive mat, fabric, plastic film, waterproof paper etc.) that will be used to wet cure the concrete.

1.5 PROTECTION
.1 Keep traffic which would affect or disturb the curing procedures off the finished surfaces for a period of 7 days minimum the minimum period of cure time specified for the concrete mix proposed by the Contractor and concrete supplier and as reviewed and approved by the Consultant.

.2 Protect exposed concrete finishes against damage.

.3 Protect floors which are to receive applied coatings and finishes against contamination by oil, paint or other deleterious materials.

.4 Protect items set into floors from damage and ensure that alignment is not disturbed.

2 PRODUCTS

2.1 MATERIALS
.1 Curing membrane: Laminated waterproof paper consisting of laminations of kraft paper and water resistant materials capable of retaining the moisture in the concrete and tough enough to remain intact for the specified curing time.

.2 Curing and sealing compound: to ASTM C309, Type 1, Class B.

.3 Hardener: "Surflex TR " by Euclid Chemicals applied at a rate of 5 kg./m^2.

.4 Filler for exposed and concealed control joints: Load bearing, epoxy-urethane filler, 'Loadflex' by Sika Canada Ltd. http://www.sikacanada.com/or other approved manufacture.

3 EXECUTION

3.1 QUALITY OF WORK
.1 General
.1 Comply with the requirements of CAN/CSA A23.1, except where greater requirements are specified herein.
.2 Comply with requirements of section 03 30 00, as applicable, and except where greater requirements are specified herein.
.3 Ensure surfaces are free of trowel marks and wash-boarding.
.4 Use compatible curing compounds, additives, admixtures, sealers and

hardeners.

.5 Do not sprinkle dry cement or dry cement and sand mixture over concrete surfaces.

.6 Curing methods and materials shall be compatible with subsequent applied finishes.

.2 Tolerances

.1 Completed surfaces shall not vary more than 6mm in 3000mm from dead level except where slopes, and slopes to drains are required.

3.2 FINISHING

.1 Control Joints

.1 Provide sawcut control joints to a depth of 1/4 of slab thickness in concrete slabs and toppings, located on column centre lines, unless closer spacing is indicated.

.2 Fill control joints with epoxy type filler.

.3 Rake out dirt in joints with an appropriate tool. Blow dirt out of joints with compressed air. Clean the floor surface by vacuuming with industrial type vacuum cleaner.

.4 Apply filler full depth of joint in accordance with manufacturer's instructions, using the recommended application method except at electrostatic dissipation flooring.

.5 Keep joints clean

.2 Moist/Wet Curing

.1 All new concrete shall be wet cured where scheduled as such, as follows:

.1 Curing Procedure: All interior concrete slabs shall be protected from premature drying for a minimum of five days, as required in ACI 301, using moisture-retaining cover. Previously used cover material that is clean, in good condition, and free of tears can be reused. Cover concrete surfaces with moisture-retaining cover, placed in widest practical width with sides and ends lapped at least 75mm and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape. Remove curing cover and allow concrete to air dry for at least twelve (12) hours prior to applying liquid densifier/sealer.

.1 Acceptable Moisture-Retaining Cover:

.1 “Transguard EG” by Reef Industries

.2 “Hydrasorb 2” by Firstline Corp.

.3 “UltraCure NCF” by McDonald Technology Group

.3 Curing and Sealing Compounds

.1 Apply curing and sealing compounds in accordance with manufacturer's directions and as required to properly cure and seal the surfaces.

.2 Apply curing compounds immediately after final finishing.

.4 Levelling and Floating

.1 Strike off concrete after it is placed, level and flush and then level and consolidate with a wooden Darby or bullfloat. Complete levelling and consolidation before free moisture (bleeding) rises to surface.

.2 When concrete has stiffened sufficiently to sustain foot pressure and after removing free bleed water, float concrete with hand or power float.

.5 Steel Trowel Finish

.1 After floating, trowel surface with steel hand or float trowel keeping blade flat at

first and raising blade angle a little more on subsequent passes. Leave surface smooth, dense, of fine uniform texture without a swirl.

.6 Broom Finish for Bond

.1 After floating, broom the substrate with a stiff bristle broom in one direction.

.7 Broom Finish for Slip Resistance (Exterior Concrete)

.1 After steel trowelling, lightly broom the surface with a bristle push broom to obtain a fine even texture finish.

.8 Hardened Concrete

.1 Coverage of premix hardener shall be 5-6 kg/m^2

.2 Apply hardener to the surface in form of three shakes, each shake being floated using power equipment. Then power-trowel and hand-trowel as necessary to a satisfactory finish.

.3 As soon as the concrete is firm enough to support the weight of workmen and their equipment and so standing water is present on the surface, apply the first shake of the hardener material. Use 50% of the total shake in the first application. Treat areas adjacent to walls and columns first. Spread the material evenly by sprinkling at right angles in two passes close to the floor level. In order to avoid non-uniform distribution of the hardener, do not broadcast from a stationary position. Allow the hardener to absorb surface moisture. Float application promptly. Work wall, column and door areas first. Avoid excessive floating, but ensure that the shake application is completely wetted and incorporated into the base slab. Follow immediately behind first floating and apply 25% of the hardener material and float again as described above. Follow immediately behind the second floating and apply the remainder of the hardener material and float again as described above.

.4 Proceed with power trowelling as soon as the floor surface begins to lose moisture sheen and stiffens, setting the trowel blades at a flat angle. As floor stiffens further, proceed with a second trowelling with the trowel angle raised. When a minimum amount of cement paste clings to the trowel edges, proceed with final trowelling. Eliminate trowel marks, pinholes or any other flaws.

.9 Remedial Work

.1 Grind floor levels which do not comply with the specified tolerances to the tolerances required or level with an approved epoxy or latex modified cementitious compound.

.2 Obtain approval of method for correcting tolerances before proceeding.

.3 Immediately prior to installation of applied floor finishes but not sooner than 28 days after concrete has been placed, examine concrete floor surfaces and repair cracks. Rout cracks which exceed 0.8 mm in width with mechanical router to 13 mm square cross section. Clean and fill cracks as specified for control joints.

3.3 SCHEDULE

.1 Following curing methods and finishes to be applied to corresponding surfaces:

SURFACE	CURING METHOD	CONCRETE FINISH
Exposed concrete floors and toppings and mechanical and electrical bases	curing and sealing compound	steel trowel
Concrete to receive resilient flooring	curing and sealing compound	steel trowel Class A to CSA A23.1
Concrete to receive ceramic tile applied using thin-set bed or adhesive methods	Wet cure (refer to 3.2.3)	steel trowel Class A to CSA A23.1
Concrete to receive ceramic tile, brick/stone/precast concrete paving and flooring applied over mortar bed system; and to receive concrete topping	Wet cure (refer to 3.2.3)	wood float Class B to CSA A23.1
Concrete to receive special flooring, seamless flooring and similar, thin, fluid applied finishes including paint	moist cure/ Wet cure (refer to 3.2.3)	steel trowel Class A to CSA A23.1
Concrete to receive carpet	curing and sealing compound	steel trowel Class A to CSA A23.1
Concrete to receive roofing and waterproofing membranes except hot rubberized asphalt	Wet cure (refer to 3.2.3)	steel trowel finish Class B to CSA A23.1
Concrete to receive hot rubberized asphalt membranes	curing and sealing compound	wood float finish Class A to CSA A23.1
Exposed concrete stair treads and landings	curing and sealing compound	steel trowel
Concrete to receive cementitious waterproofing	Wet cure (refer to 3.2.3)	wood float
Concrete to receive water repellent coatings	Wet cure (refer to 3.2.3)	fine textured float finish

.2 Should the Contractor elect to use a cure and seal cure method in lieu of where moist/wet cure specified, the cost of blast tracking the resultant surface to make it suitable to accept the applied finish shall be borne by the Contractor.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Masonry Procedures.
.2 Mortar and Grout for Masonry.
.3 Masonry Reinforcing & Connectors.
.4 Masonry Accessories.
.5 Plain Concrete Unit Masonry.

1.3 REFERENCES

.1 CSA-A165 Series; CSA Standards on Concrete Masonry Units.
.2 CSA-A179; Mortar and Grout for Unit Masonry.
.3 CSA-A370; Connectors for Masonry.
.4 CSA-A371; Masonry Construction for Buildings.
.5 CSA-S304.1; Masonry Design for Buildings (Limit States Design).

1.4 SUBMITTALS

.1 Test Reports

.1 Manufacturers of concrete masonry units must submit independent laboratory test reports performed within the twelve month period immediately prior to date of delivery of material, certifying compliance of masonry units and mortar components with specification requirements, in accordance with Section 01 30 00.

1.5 SOURCE QUALITY CONTROL

.1 All concrete masonry units supplied for this project must be new and from one supplier only, unless otherwise specified herein.

.2 All Architectural masonry units supplied for this project must be from same production run for each type.

.3 Concrete masonry units exposed to view must not exhibit voids, cracks, chipped edges or corners, or other surface imperfections.

1.6 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:

.1 Contractor (Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.7 MOCK-UP

.1 Where mock-up involves components of other trades coordinate construction of mock-up with those trades.

.2 Construct sample panel of an exterior cavity wall including reinforcement, insulation, air barrier, flashings and weep holes, minimum 1.2m x 1.8m in size. Build sample panel in stepped-back fashion to expose each material used (veneer masonry, insulation, air barrier, back-up block) to a minimum height of 400mm each. Locate panel where directed by Consultant and keep panel until completion of exterior masonry; panel may not be incorporated into finished work.

.3 Mock-up will be reviewed for approval by the Consultant. If rejected, correct mock-up and request re-review by Consultant. If approved, mock-up may remain in place for duration of masonry work, and will serve as the minimum acceptable standard for work of this section and related sections.

1.8 DELIVERY, STORAGE & HANDLING

.1 Deliver materials to job site in dry condition. Keep materials dry until use except where wetting is specified.

.2 Deliver all masonry units cubed and banded on hardwood pallets, with polyethylene "shrink-wrap", or other non-staining covering. Prevent damage to units.

.3 Deliver mortar materials in original unbroken and undamaged packages with manufacturer's name and brand distinctly marked thereon, and upon delivery store in dry shed until used on work.

.4 Store or pile sand on a plank platform and protect from dirt and rubbish. Store mortar materials and sand in such a manner as to prevent deterioration or contamination by foreign materials.

.5 Lift skids with proper and sufficiently long slings or forks with protection to prevent damage to units. Protect edges and corners.

.6 Store masonry in a manner designed to prevent damage and staining of units.

.7 Place polyethylene or other plastic film between wood and other finished surfaces of units when stored for extended periods of time.

.8 Cover stored units with protective enclosure if exposed to weather.

.9 Do not use salt or calcium-chloride to remove ice from masonry surfaces.

1.9 PROJECT CONDITIONS

.1 Cold Weather Requirements

.1 Supplement Clause 5.16.2.1 of CSA-A371 with the following:

.1 Maintain mortar temperature between 5°C and 50°C for a minimum of 3 days after setting.

.2 Hot Weather Requirements

.1 Supplement Clause 5.16.4 of CSA-A371 with the following:

.1 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.

2 PRODUCTS

2.1 MATERIALS

.1 Use same suppliers of masonry units, accessory materials and source of aggregate for entire project.

.2 Portland cement: Type 10 to CSA-A5.

.3 Blended Cement: to CSA-A362.

.4 Aggregates: to CSA-A23.1.

.5 Hydrated Lime: to ASTM C207.

.6 Supplementary Cementing Materials: to CSA-A23.5.

2.2 CONCRETE MASONRY UNITS (CMU)

.1 The physical properties of the concrete masonry units at the time of delivery by the manufacturer to the site, shall conform to the requirements of Table 1 of CSA-A165.1, as classified herein. Test reports submitted to the Consultant by the manufacturer prior to delivery shall verify conformance, in order for material to be acceptable.

.2 Provide special shapes such as return corners, ashlar blocks, lintels, universal knock-outs, A-blocks, sash blocks, piers, bull-nosed blocks, etc., to perform masonry work with minimal cutting or breaking of masonry units.

.3 Standard Weight Concrete Masonry Units: to CSA-A165.1.

.1 Classification: H/15/A/M.

.2 Sizes:

.1 OCBA metric modular.

.2 Imperial sizes to match existing building where required.

.3 Thicknesses: as indicated on the drawings.

.4 Lightweight Concrete Masonry Units: to CSA-A165.1.
- .1 Classification: H/15/D/M.
- .2 Sizes:
  - .1 OCBA metric modular.
  - .2 Imperial sizes to match existing building where required.
  - .3 Thicknesses: as indicated on the drawings.

.5 75% Solid Concrete Masonry Units: to CSA-A165.1.
- .1 Classification: SS/15/A/M.
- .2 Size: OCBA metric modular.
  - .1 Thicknesses: as indicated on the drawings.

2.3 HORIZONTAL REINFORCEMENT

.1 Horizontal reinforcement shall be sized to suit width of masonry in accordance with CSA-A371. Undersized or oversized reinforcing is not acceptable.

.2 Provide pre-manufactured "L" and "T" corner units. Crimped metal strap ties are not acceptable for connecting intersecting walls.

.3 Corrosion protection: to CSA-A370, hot-dip galvanized for metal ties and horizontal reinforcing in exterior walls.

.4 Single Wythe Masonry: Standard 3.66mm wire with hot-dip galvanized finish after fabrication to CSA-A371;
- .1 Ladder Type:
  - .1 Blok-Lok® BL-10, by Blok-Lok Ltd.
  - .2 220 Ladder Mesh, by Hohmann & Barnard Inc.
- .2 Truss type:
  - .1 Blok-Trus® BL-30, by Blok-Lok Ltd.
  - .2 120 Truss Mesh, by Hohmann & Barnard Inc.

.5 Partition Stabilization: PTA 420 Partition Top Anchor, by Hohmann & Barnard Inc.

2.4 MORTAR AND GROUT

.1 Use aggregate passing 1.18mm sieve where 6 mm thick joints are indicated, to CSA-A179.

.2 Mortar for foundation walls, manholes, sewers, pavements, walks, patios and other exterior masonry at or below grade and under joist and beam bearings and other locations noted on the structural drawings: Type "M" based on specifications of CSA-A179.

.3 Mortar for masonry and all load-bearing concrete masonry above grade, including inner wythe of exterior cavity walls: Type "S" based on specifications of CSA-A179.

.4 Mortar Colour: natural.

.5 Grout: for masonry shall be pre-mixed, high strength, non-shrink cementitious grout, to CSA-A179, with minimum compressive strength of 30MPa.

.6 All mortar products for masonry work shall be batch plant mixed for quality control. No hand mixing will be permitted. Use Maxi-Mix or other similar batch plant system.

2.5 ACCESSORIES

.1 Control Joint Block Fillers: "Titewall" by Bloc-Lok Ltd., or "RS Series" by Hohmann & Barnard Inc.

.2 Dampproof Course (Base of Wall): self-adhesive, polymer-coated copper sheet;
.1 Copper-Tuff SA by Hohmann & Barnard Inc.

.3 Drip Plate for Dampproof Course (Base of Wall): Type 304 stainless steel, with facrory-installed 3mm thick compressible foam seal. Provide factory-made inside and outside corners;
.1 FTS-LB, by Hohmann & Barnard Inc.

.4 Through-wall Flashing: self-adhesive, SBS asphalt sheet;
.1 Blueskin TWF by Bakor.
.2 Air-Shield by W.R. Meadows of Canada.

.5 Through-Wall Flashing Primer: polymer emulsion based primer, Blueskin Aquaprime by Bakor.

.6 Through-wall Flashing Support: 0.38mm thick hot-dip galvanized sheet steel, formed to suit.

3 EXECUTION

3.1 QUALITY OF WORK

.1 Perform masonry work in accordance with CSA-A371, except where specified otherwise.

.2 Build masonry plumb, level, and true to line, with vertical joints in alignment.

.3 Perform masonry mortar and grout work in accordance with CSA-A179 except where specified otherwise.

.4 Provide temporary bracing of all masonry walls until permanent bracing is installed.

.5 Lay out coursing and bond to achieve correct coursing heights and continuity of bond above and below openings, with minimum of cutting.

.6 Machine cut all exposed masonry units where adjusted in size.

.7 Tolerances in notes to Article 5.3 of CSA-A371 apply.

.8 Remove chipped, cracked, or otherwise damaged units and replace with new.

.9 Coordinate work of this section with work of mechanical and electrical trades for conduit, piping, and other items built-in to masonry work. Masonry Subcontractor must cooperate with mechanical and electrical trades, for placement of such items within masonry walls.

3.2 THROUGH-WALL FLASHING & DAMPPROOF COURSE

.1 Clean and wire-brush all surfaces to receive through-wall flashing or dampproof course. Remove all dirt, oil and loose mortar material.

.2 Prime all surfaces to receive through-wall flashing or dampproof course at a rate of 3.78 L/9.3-28m^2 and allow to dry for 30 minutes before applying membrane.

.3 Position membrane to allow for minimum 50mm laps at all edges.

.4 Roll back membrane and remove release paper. Press membrane firmly into primer. Roll membrane and seams to ensure full contact.

.5 Where membrane traverses cavity unsupported by substrate or other means, provide continuous galvanized bent metal flashing support, mortared into back-up wythe of masonry (or fastened to steel studs), and continuous to outside face of exterior wythe of masonry.

.6 Minimum vertical height of metal flashing support shall be 200mm.

3.3 LAYING CONCRETE MASONRY UNITS

.1 Bond: plain running bond.

.2 Coursing Heights:

.1 Standard Block: 200mm for one 190mm high block + one joint.

.3 Construct all masonry walls full height to underside of structure or deck above, unless otherwise shown. Leave 25mm void between top of wall and structure above. Fill void with 25x152mm mineral wool insulation. Where walls are fire separations, firestop to Section 07 84 00.

.4 Set bearing plates for joists, beams, etc., at locations and elevations indicated, and grout into place.

.5 Special Shapes

.1 Provide Universal Knock-out blocks for chases for piping and conduit.
.2 Provide A-Blocks for all vertical reinforcing locations.
.3 Provide Lintel blocks over all openings where steel lintels are not specified.
.4 Provide bullnose blocks for all conditions detailed on the drawings.

.6 Provide lightweight block for all fire-rated applications, and all block exposed to view.

.7 Provide standard weight block for all non-fire rated applications, where concealed.

.8 Provide solid masonry units where required for mechanically fastening of blocking, furring or mechanically applied finishes.

.9 Do not form chases in load-bearing walls less than 240mm thick. Do not form chases closer than 2m apart in any wall, unless otherwise shown.

.10 Do not construct horizontal chases for piping or conduit unless other reasonable means of allowing for services are impossible. Where horizontal chases are required, construct chases using lintel blocks filled solid with concrete fill as specified.

.11 Build in conduits as required without breaking bond.

3.4 JOINTING

.1 Allow joints to set sufficiently to remove excess water;

.1 Concave Joints: tool with round jointer to provide smooth, compressed, uniformly concave joints, vertical and horizontal. Provide concave joints at all standard concrete block walls exposed to view to receive paint finish.

.2 Flush: strike flush all joints concealed in walls, and joints in walls to receive plaster, tile, insulation, or other applied material except paint or similar thin finish coating.

.2 Remove all excess mortar from surface of masonry.

3.5 CONCRETE MASONRY LINTELS

.1 Install reinforced concrete masonry lintels over all openings in masonry wider than 400mm where steel or reinforced concrete lintels are not indicated.

.2 Reinforced concrete masonry lintels may be formed on the ground and lifted into place.

.3 End bearing shall be not less than 200mm.

.4 Maintain sufficient support for lintels until initial compressive strength of concrete fill is reached (min. 7 days).

3.6 VERTICAL REINFORCING

.1 Refer to Section 03 20 00.

.2 Place vertical reinforcement in cells of concrete unit masonry as detailed on the drawings. Provide A-Blocks where required to facilitate ease of placement.

.3 Place vertical reinforcement accurately and secure against displacement by using ties or clips. Tack welding of reinforcement to secure in place will not be permitted.

.4 Secure vertical reinforcement in walls using sufficient spacers on each face to maintain the requisite distance between reinforcement and wall face and so that vertical bars are plumb. Provide spreader bars spaced at 2m centres in both directions.

.5 Place concrete fill in masonry unit cells, in maximum 2 course lifts. Vibrate to remove all air pockets.

3.7 HORIZONTAL REINFORCING

.1 At all single and double wythe concrete masonry walls, install reinforcing at vertical intervals of 400mm maximum and lapped 152mm at each splice.

.2 Provide reinforcement in the first, second and top bed joints at 200mm vertical spacing, every second joint thereafter.

.3 Provide additional reinforcement immediately above lintel and below sill courses, extending 600mm beyond each jamb.

.4 Provide masonry veneer ties at exterior cavity walls with CMU back-up, at vertical intervals of 400 mm maximum, and horizontal intervals of 600mm maximum.

.5 Install insulation retainers at every veneer tie point.

3.8 LATERAL SUPPORT AND ANCHORAGE

.1 Provide lateral support and anchorage in accordance with CAN3-S304, and as indicated on the drawings.

.2 Where walls exceed the limits stated in CAN3-S304, provide partition stabilization anchors at top of masonry partitions for full length of wall at 1220mm o.c. maximum.

3.9 FIRE STOPPING OF CAVITY

.1 Install continuous "Z" bar fire stops in cavity prior to installation of insulation, fastened to inner wythe of masonry, to the requirements of the Ontario Building Code.

.2 Cavity fire stops shall span full depth of cavity from inner wythe to outer wythe of masonry. Vertical stops shall be placed at borders of area to be fire stopped.

3.10 CONTROL JOINTS

.1 Provide vertical control joints to CSA-A371, and as shown on the drawings.

.2 Width of control joints shall be 10mm.

.3 Horizontal reinforcing shall be continuous across control joints.

.4 Control joints shall be continuous across thickness of exterior wall. Where vertical joints in wythes of brick and block do not align, offset of maximum 200mm is allowable.

.5 Refer to the drawings for details, otherwise the following minimum requirements for vertical control joints in unit masonry shall apply:

.1 Above all openings in masonry, extending from end point of lintel to top of masonry.
.2 At all structural column or pilaster locations.
.3 All locations where structural substrate changes.
.4 At all uninterrupted panels of masonry. Maximum panel width 7m.
.5 Within 1000mm each side of changes in direction of wall.

3.11 WEEPERS & VENTS

.1 Provide weepers at base of all exterior cavity walls at 600mm o.c. maximum, and vents at top of all exterior cavity walls at 1220mm o.c. maximum.

.2 Provide weepers in walls above junctions with roofs and above windows exceeding 1220mm in length.

3.12 JOINING OF WORK

.1 Where necessary to temporarily stop horizontal runs of masonry, and in building corners, step-back masonry diagonally to lowest course previously laid. Do not "tooth-in" new masonry. Fill in adjacent courses before heights of stepped masonry reach 1220mm.

3.13 SUPPORT OF LOADS

.1 For all masonry under concentrated loads, where concrete fill is used in lieu of solid units, use minimum 15MPa concrete for width and depth equal to 3 times the length of bearing.

.2 Use grout to CSA-A179 where grout is used in lieu of solid units.

.3 Install building paper below voids to be filled with concrete. Keep paper 13mm back from faces of units.

3.14 FIELD QUALITY CONTROL

.1 The work of this section is subject to inspection and testing as specified in Section 01 40 00. Allow for independent inspection by an Independent Testing Authority. Costs for inspection and testing will be paid by the Owner.

.2 Prior to commencement of construction, the masonry Subcontractor shall prepare and mix on-site, under supervision of the Consultant and the Inspection and Testing Authority, mortar samples to determine compliance with the specifications

.3 Tests of such samples shall determine a ratio-by-mass value or "control value" for mortar mixes.

.4 Masonry Mortar shall be tested in accordance with CSA-A179; Mortar and Grout for Unit Masonry, supplemented as follows:

.1 Additional cubes shall be poured under on-site conditions for comparison with "ideal" samples.

.5 Subsequent sample ratio tests taken during the course of construction shall not vary from the control value by more than 15%.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide all miscellaneous metal fabrications. Specific items herein do not represent a full and complete inventory of all miscellaneous metals items. The Contractor is responsible for providing all items as specified herein and as shown on the drawings.

1.3 REFERENCE STANDARDS

.1 ASTM-A53/A53M; Specification for Pipe, Steel Black and Hot-Dipped, Zinc Coated, Welded and Seamless.
.2 ASTM-A325; Specification for High Strength Bolts for Structural Steel Joints.
.3 ASTM-A563; Specification for Carbon and Alloy Steel Nuts.
.4 ASTM-C1107; Specification for Packaged Dry, Hydraulic-Cement Grout (Non-Shrink).
.5 Aluminum Association (AA); DAF-45, Designation System for Aluminum Finishes.
.6 CSA-W47.1; Certification of Companies for Fusion Welding of Steel Structures.
.7 CSA-W55.3); Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
.8 CSA-W59; Welded Steel Construction (Metal Arc Welding).
.9 CSA-G40.20/G40.21; General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steels.
.10 CAN/CSA-G164; Hot Dip Galvanizing of Irregular Shaped Articles.
.11 CAN/CGSB-1.40; Primer, Structural Steel, Oil Alkyd Type.
.12 CAN/CGSB-1.181; Ready-Mixed Organic Zinc-Rich Coating.

1.4 PERFORMANCE REQUIREMENTS

.1 Guard assemblies shall be designed, fabricated, and installed to conform to the requirements of the Ontario Building Code.

1.5 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Companies to be certified under Division 1 or 2.1 of CSA-W47.1 for fusion welding, and CSA-W55.3 for resistance welding. Provide certification that all welded joints are certified by Canadian Welding Bureau.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:

.1 Contractor (Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.6 SUBMITTALS

.1 Shop Drawings

.1 Submit shop drawings in accordance with Section 01 30 00.

.2 Each shop drawing submitted shall bear the stamp and signature of a qualified Professional Engineer registered in the Place of the Work who has coverage of minimum $2,000,000 liability insurance.

.3 Submit all necessary shop drawings, bearing the professional seal and signature of the Subcontractor' Engineer, including design calculations for review by the Consultant. Shop drawings to include all necessary shop details and erection diagrams with;

.1 member sizes, locations, thickness (exclusive of coatings), metallic coatings and mechanical properties,
.2 connection details for attaching framing to itself and to the structure,
.3 dimensions, requirements of related work, and critical installation procedures,
.4 temporary bracing required for erection purposes,
.5 design loads, and
.6 welds indicated by welding symbols as defined in CSA-W59.

.4 Submit copies of engineering calculations and/or certified data verifying the capacity of members, connectors, connections, and the ability of assemblies to meet the design requirements, signed and sealed by the Subcontractor's Engineer.

.5 Do not fabricate until submittals are reviewed and approved by Consultant.

.2 Samples

.1 Submit samples in accordance with Section 01 30 00.

.2 Submit samples of aluminum fabrications in shapes as detailed and in colours selected, for review by the Consultant.

2 PRODUCTS

2.1 MATERIALS

.1 Steel Sections And Plates: to CAN/CSA-G40.21, grade 300W.

.2 Steel Pipe: to ASTM-A53/A53M, standard weight, yield strength 240 MPa, black or galvanized finish.

.3 Welding Materials: to CSA-W59.

.4 Bolts And Nuts: to ASTM-A325 and ASTM-A563. To ASTM A307, galvanized to ASTM A153/A153 for galvanized components.

.5 Galvanizing: hot dipped galvanizing with minimum zinc coating in accordance with Table 1 of CAN/CSA-G164.

.6 Shop Primer: oil-alkyd type, to CAN/CGSB-1.40.

.7 Galvanized Primer: zinc-rich, ready mix to CAN/CGSB-1.181.

2.2 FABRICATION

.1 Metal fabrications in Natatorium and Natatorium change room environments, including fasteners, shall be stainless steel 904L grade corrosion resistant unless indicated otherwise.

.2 Refer to drawings and details for items not specified herein.

.3 Fabricate work square, true, straight, and accurate to required size, with joints closely fitted and properly secured.

.4 Use self-tapping shake-proof countersunk, Robertson flat head, screws on items requiring assembly by screws. Use screws for interior metal work. Use welded connections for exterior metal work unless otherwise detailed or approved by Consultant.

.5 Where possible, fit and shop assemble work, ready for erection.

.6 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

.7 Miscellaneous Angles, Plates and Lintels Not Provided by Structural: Steel angles, prime painted in sizes indicated. Provide 150mm minimum bearing at ends. Weld back-to-back angles to profiles where indicated.

.8 Toilet Partition Supports: fabricate from prime painted steel sections. Fabricate steel frame to have level bottom plate to support pilasters, and lateral bracing to prevent sway.

2.3 FINISHES

.1 Steel

.1 Shop Painting

.1 Apply one shop coat of alkyd steel primer to metal items, with exception of galvanized or concrete encased items.

.2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7°C.

.3 Clean surfaces to be field welded; do not paint.

.2 Field Painting

.1 Refer to Sections 09 91 13, and 09 91 16, for field finishing.

3 EXECUTION

3.1 ERECTION

.1 Install all miscellaneous metals items specified herein and detailed on the drawings.

.2 Do welding work in accordance with CSA-W59 unless specified otherwise.

.3 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.4 Provide suitable means of anchorage acceptable to Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.

.5 Exposed fastening devices to match finish and be compatible with material through which they pass.

.6 Provide components for building-in by other sections in accordance with shop drawings and schedule.

.7 Make field connections with high tensile bolts, or weld.

.8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection, with primer.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 Subcontractors involved in the work of this section shall examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Construction Manager for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Pre-engineered metal connectors used to support wood framing, wood-framed trusses, or composite wood members from concrete, masonry, steel, wood, or composite wood supporting members.

1.3 REFERENCES

.1 ASTM A36; Carbon Structural Steel
.2 ASTM A167; Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
.3 ASTM A193-B7; Alloy Steel and Stainless Steel Bolting Materials for High Temperature Service
.4 ASTM A307; Carbon Steel Bolts and Studs
.5 ASTM A500; Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
.6 ASTM A625; Tin Mill Products, Black Plate, Single Reduced
.7 ASTM A653; Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated Galvannealed) by the Hot-Dip Process
.8 ASTM A706; Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
.9 ASTM A924/A 924M; General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
.10 ASTM A1011; Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
.11 ASTM F1667; Driven Fasteners: Nails, Spikes, and Staples
.12 ASTM D1761; Standard Test Methods for Mechanical Fasteners in Wood
.13 ICBO AC13; Acceptance Criteria for Joist Hangers and Similar Devices
.14 ICBO AC95; Acceptance Criteria to Determine Bending Yield Moment for Nails
.15 ICBO AC120; Acceptance Criteria for Wood Screws
.16 AISI 1996; Cold-Formed Steel Specification
.17 1997 NDS; National Design Specification

1.2 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in

the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application
.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting
.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:
.1 Construction Manager (Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.4 DELIVERY, STORAGE, AND HANDLING
.1 Deliver products to job site in manufacturer's or distributor's packaging undamaged, complete with installation instructions.

.2 Protect and handle materials in accordance with manufacturer's recommendations to prevent damage or deterioration.

2 PRODUCTS

2.1 MANUFACTURERS
.1 Manufacturer: Simpson Strong-Tie Co., Inc.

.2 Equivalent or better products by another manufacturer may be acceptable. Confirm load capacity based on published testing data and calculations. The Consultant shall evaluate and give written approval for substitution by addenda.

2.2 MATERIALS
.1 Steel
.1 Sheet: ASTM A625, ASTM A653, ASTM A1011.
.2 Fasteners: ASTM F1667, SAE C1022 (SDS Screws).

.2 Stainless Steel
.1 Sheet: ASTM A167.

.3 Finishes
.1 Hot-dip galvanized: Z275.
.2 Zinc and dichromate for SDS screws.

2.3 FABRICATION
.1 Shop assembly to occur per the manufacturer's approved production drawings.

.2 Fabrication tolerances per manufacturer.

.3 Fabrication requiring welding shall be performed in accordance with the current American Welding Society's standards.

.4 The manufacturer's identification shall be stamped into the metal part and/or a label may be attached to the part with adhesive.

2.4 TESTING

.1 Allowable loads published in manufacturer's data to be determined using the minimum load from static and/or cyclic analysis and one or more of the following test methods:

.1 Static load tests in wood assemblies.

.2 Static load tests in steel jigs.

.3 Static load tests of products embedded in concrete or masonry.

.4 Cyclic or static load tests in wood assemblies (Anchor Tie-down System).

.5 Testing to determine allowable loads shall be performed as per ICBO Acceptance Criteria 13 (AC13) and/or ASTM D1761.

.6 Allowable loads for hangers are determined by a static load test resulting in not more than a 3mm deflection of the joist relative to the header, or the lowest test ultimate load divided by 3, or the fastener allowable load as determined by the NDS, whichever is lower.

.7 Testing shall be conducted under the supervision of an independent laboratory.

.8 Manufacturer to provide code testing data on all products that have been code tested upon request.

3 EXECUTION

3.1 EXAMINATION

.1 Unless otherwise specified, allowable loads are for Douglas Fir-Larch under continuously dry conditions. Allowable loads for other species or conditions must be adjusted according to the code. See manufacturer's catalogue for additional notes and requirements.

.2 Built-up lumber (multiple members) must be fastened together to act as one unit to resist the applied load.

.3 Verify that the dimensions of the supporting member are sufficient to receive the specified fasteners.

3.2 INSTALLATION

.1 Where fasteners and connectors are installed with untreated lumber in dry conditions, use connectors having electro-galvanized finish. Where fasteners and connectors are installed with treated lumber (pressure preservative treated or fire retardant treated) use connectors having hot-dip galvanized finish minimum 610g/m^2 coating.

.2 Unless otherwise specified, bolts and nails shall not be combined.

.3 Unless otherwise specified, bending steel in the field may cause fractures at the bend line. Fractured steel will not carry load and must be replaced. When bending is allowed, the connector shall be allowed one cycle bend, one time only.

.4 A fastener that splits the wood will not take the design load. Evaluate splits to determine if the connection will perform as required. Dry wood may split more easily and should be evaluated as required. If wood tends to split, consider pre-boring holes with diameters not exceeding 0.75 of the nail diameter (1997 NDS).

.5 Wood shrinkage shall be taken into account when designing and installing connections.

.6 Built-up lumber (multiple members) must be fastened together to act as one unit to resist the applied load.

.7 Top flange hangers may cause unevenness. Possible remedies should be evaluated by a professional and include using a face mount hanger, routing the beam, or cutting the subfloor to accommodate the top flange thickness.

.8 Do not overload by exceeding the manufacturer's allowable load values.

.9 Unless otherwise specified, fill all fastener holes with fastener types as specified in the manufacturer's catalogue.

.10 All specified fasteners must be installed according to the manufacturer's instructions.

.11 Bolt holes shall be minimum 0.8mm and maximum 1.6mm larger than the bolt diameter (NDS)

.12 Install all specified fasteners before loading the connection.

.13 Use proper safety equipment.

.14 Welding shall be in accordance with the American Welding Society (AWS) standards.

.15 Welding galvanized steel may produce harmful fumes, follow proper welding procedures and safety precautions.

.16 Nail tools with hole-location mechanisms may be used to install connectors, provided the correct quantity and type of nails are properly installed in the nail holes.

.17 Joist shall bear completely on the connector seat, and the gap between the joist end and the header shall not exceed 3mm.

.18 Installer of ATS system to cut rods to length as required.

.19 Modifications to products or changes in installation procedures should only be made by the Consultant. The performance of such modified products or an altered installation procedure is the sole responsibility of the Consultant.

3.3 FIELD QUALITY CONTROL

.1 Determine that the proper part is being used in the correct application and has been fabricated by the approved manufacturer by observation of the stamp into the metal part and/or the adhesive label on the product denoting part and manufacturer name.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 Subcontractors involved in the work of this section shall examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Construction Manager for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide rough carpentry work, including but not limited to, the following:

.1 Structural framing and sheathing as required,
.2 Wood nailers, curbs and sheathing for roofing,
.3 Electrical mounting boards, and
.4 Rough blocking in walls for support of wall-mounted items.

1.3 REFERENCES

.1 CSA-B111-1974 (R1998); Wire Nails, Spikes and Staples.
.2 CAN/CSA-G164-M92 (R1998); Hot Dip Galvanizing of Irregularly Shaped Articles.
.3 CSA-O80 Series-97; CSA Standards for Wood Preservation.
.4 CSA-O86-01; Engineering Design in Wood (Working Stress Design).
.5 CSA-O121-M1978 (R1998); Douglas Fir Plywood.
.6 CAN/CSA-O141-91 (R1999); Softwood Lumber.
.7 CAN/CSA-O325.0-92 (R1998); Construction Sheathing.
.8 CSA-O437 Series-94 (R2001); Standards for OSB and Waferboard.
.9 CAN/ULC-S102; Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
.10 National Lumber Grades Authority (NLGA) Special Products Standard for Finger joined Structural Lumber SPS-1991.
.11 National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber-1991.

1.4 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application
.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting
.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:
.1 Construction Manager (Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

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

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

2 PRODUCTS

2.1 LUMBER MATERIAL
.1 Lumber: SPF softwood, NLGA No. 2 Grade or better, S4S, kiln-dried with moisture content 19% or less in accordance with CAN/CSA-O141.

.2 Framing and board lumber: in accordance with OBC Subsection 9.3.2.

.3 Machine stress-rated lumber is acceptable for all purposes.

.4 Glued end-jointed (finger-jointed) lumber products certified under NLGA Special Products Standard 1-81 are acceptable except for material for "A" appearance framing to be left unfinished or to be finished with transparent or translucent type coating.

.5 Furring, blocking, nailing strips, grounds, rough bucks, curbs, fascia backing, and sleepers:
.1 S2S is acceptable.
.2 Board sizes: "Standard" or better grade.
.3 Dimension sizes: "Standard" light framing or better grade.

.6 Pressure Preservative Treated Lumber: SPF softwood, NLGA No. 2 Grade or better, S4S, kiln-dried with moisture content 19% or less in accordance with CAN/CSA-O141; pressure preservative treated with Copper Azole (CBA-A or CA-B), or Alkaline Copper Quaternary (ACQ) to CSA-O80 Series.

2.2 PANEL MATERIALS
.1 Construction Sheathing: to CAN/CSA-O325.0, thickness as indicated.

.2 Douglas Fir Plywood: to CSA-O121, standard construction, thickness as indicated.

.3 Pressure Preservative Treated Plywood: Canadian softwood plywood to CSA-O151, standard construction; pressure preservative treated with Copper Azole (CBA-A or CA-B), or Alkaline Copper Quaternary (ACQ) to CSA-O80.9 and kiln-dried to a moisture content of 15% or less. Thickness as indicated.

.4 Fire Retardant Treated Plywood: Douglas Fir Plywood to CSA-O121, standard construction; fire retardant treated to CSA-O80.27, then kiln-dried to a moisture content of 15% or less, and having a Flame Spread rating of less than 25 to CAN/ULC-S102. Product must be UL or ULC labeled. Thickness as indicated.

.5 Mat-Formed Structural Panels (OSB/Waferboard): to CAN3-O437, thickness as indicated.

2.3 ACCESSORIES

.1 Polyethylene Film: to CAN/CGSB-51.34, 0.15mm thick.

.2 Sealants: in accordance with Section 07 92 00.

.3 General Purpose Adhesive: to CSA-O112 Series.

.4 Nails, Spikes and Staples: to CSA-B111.

.5 Bolts: minimum 13mm diameter steel, unless indicated otherwise, complete with nuts and washers.

.6 Proprietary Fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.

.7 Metal Connectors: to Section 06 05 23, galvanized.

.8 Nailing Discs: flat caps, minimum 25mm diameter, minimum 0.4mm thick, sheet metal, formed to prevent dishing. Bell or cup shapes not acceptable.

.9 Connector and Fastener Finishes

.1 Hot-dip galvanized connectors and fasteners to CAN/CSA-G164 minimum 610g/m^2 coating for:

.1 Exterior work (outside of building vapour barrier)

.2 Interior highly humid areas, and

.3 Fire-retardant treated wood.

.2 Stainless Steel: use Type 304 stainless steel fasteners for pressure-preservative treated wood.

.10 Surface-applied wood preservative: to CAN/CSA-O80 Series; Copper Azole (CBA-A or CA-B) or Alkaline Copper Quaternary (ACQ).

3 EXECUTION

3.1 PREPARATION

.1 Treat cut surfaces of pressure preservative treated material exposed by cutting, trimming, or boring with wood preservative before installation.

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

3.2 INSTALLATION

.1 Comply with requirements of the Ontario Building Code, supplemented by following paragraphs:

.1 Install members true to line, levels and elevations, square and plumb.

.2 Construct continuous members from pieces of longest practical length.

.3 Install spanning members with "crown-edge" up.

.4 Select exposed framing for appearance. Install lumber and panel materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.

.5 Install roof sheathing in accordance with requirements of NBC.

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

.7 Install furring to support siding applied vertically where there is no blocking and where sheathing is not suitable for direct nailing.

.8 Align and plumb faces of furring and blocking to tolerance of 1:600.

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

3.3 ERECTION

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

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

.3 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.

3.4 SCHEDULES

.1 Wall Sheathing

.1 DF Plywood: 13mm thick.

.2 Roof Sheathing

.1 DF Plywood: 19mm thick T&G.

.3 Parapet and Curb Sheathing on Roof Areas

.1 Plywood: Pressure Preservative Treated, 13mm thick.

.4 Electrical Equipment Mounting Boards

.1 Plywood: Fire Retardant Treated, S1S, square edges, minimum 20mm thick.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 Subcontractors involved in the work of this section shall examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Construction Manager for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide prefabricated wood trusses.

1.3 REFERENCES

.1 CSA-O80 Series; CSA Standards for Wood Preservation.
.2 CSA-O86; Engineering Design in Wood (Working Stress Design).
.3 CAN/CSA-O141; Softwood Lumber.
.4 CSA-S307; Load Test Procedure for Wood Roof Trusses for Houses and Small Buildings.
.5 CSA-S347; Method of Test for Evaluation of Truss Plates Used in Lumber Joints.
.6 CSA-W47.1; Certification of Companies for Fusion Welding of Steel Structures.

1.4 DESIGN CRITERIA

.1 Design trusses, bracing and bridging in accordance with CSA-O86 for building locality as ascertained by NBC Supplement No. 1, Climatic Information for Building Design in Canada and minimum uniform and minimum concentrated loadings stipulated in NBC commentary.

.2 Limit live load deflection to 1/360th of span where gypsum board ceilings are hung directly from trusses.

.3 Limit live load deflections to 1/240th of span unless otherwise specified or indicated.

.4 Provide camber for trusses as indicated.

1.5 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in

accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:

.1 Construction Manager (Site Superintendent & Project Manager)

.2 Application Subcontractor (Site Foreman & Project Manager)

.3 Product Manufacturer and/or Distributor (Technical Representatives)

.4 Related Subcontractors whose work is affected by that of this Section.

1.6 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 30 00.

.2 Each shop drawing submission showing connection details shall bear signature and stamp of Professional Engineer licensed to practice in the Place of the Work.

.3 Indicate species, sizes, and stress grades of lumber used as truss members. Show pitch, span, camber, configuration and spacing of trusses. Indicate connector types, thicknesses, sizes, locations and design value. Show bearing details. Indicate design load for each member.

.4 Submit stress diagram or print-out of computer design indicating design load for each truss member. Indicate allowable load and stress increase.

.5 Provide certification that trusses meet requirements of CSA-S307.

.6 Indicate arrangements of webs or other members to accommodate ducts and other specialties.

.7 Show lifting points for storage, handling and erection.

.8 Show location of lateral bracing for compression members.

1.7 DELIVERY AND STORAGE

.1 Store trusses on job site in accordance with manufacturer's instructions. Provide bearing supports and bracings. Prevent bending, warping and overturning of trusses.

2 PRODUCTS

2.1 MATERIALS

.1 Lumber: SPF softwood, NLGA No. 2 Grade or better, S4S, kiln-dried with moisture content 19% or less in accordance with CAN/CSA-O141.

.2 Framing and board lumber: in accordance with OBC 1990 Subsection 9.3.2.

.3 Machine stress-rated lumber is acceptable for all purposes.

.4 Glued end-jointed (finger-jointed) lumber products certified under NLGA Special Products Standard 1-81 are acceptable except for material for "A" appearance framing to be left unfinished or to be finished with transparent or translucent type coating.

.5 Metal Connectors: to Section 06 05 23.

.6 Pressure Preservative Treated Lumber: SPF softwood, NLGA No. 2 Grade or better, S4S, kiln-dried with moisture content 19% or less in accordance with CAN/CSA-O141; pressure preservative treated with water-borne, Copper Azole (CBA-A or CA-B), to CSA-O80.2.

2.2 FABRICATION

.1 Fabricate wood trusses in accordance with reviewed shop drawings.

.2 Provide for design camber and roof slopes when positioning truss members.

.3 Connect members using metal connector plates.

.4 Apply preservative and fire retardant in accordance with CSA-O80 Series.

3 EXECUTION

3.1 ERECTION

.1 Erect wood trusses in accordance with reviewed erection drawings.

.2 Indicated lifting points to be used to hoist trusses into position.

.3 Make adequate provisions for handling and erection stresses.

.4 Exercise care to prevent out-of-plane bending of trusses.

.5 Install temporary horizontal and cross bracing to hold trusses plumb and in safe condition until permanent bracing and decking are installed.

.6 Install permanent bracing in accordance with reviewed shop drawings, prior to application of loads to trusses.

.7 Do not cut or remove any truss material without approval of Consultant.

.8 Remove chemical and other surface deposits on treated wood, in preparation for applied finishes.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide all Finish Carpentry work including the following:

.1 Supply and installation of all miscellaneous wood & trim.
.2 Installation of all hollow metal doors and frames.
.3 Installation of all finish hardware.

1.3 REFERENCES

.1 CSA-B111; Wire Nails, Spikes and Staples.
.2 CAN/CSA-G164; Hot Dip Galvanizing of Irregularly Shaped Articles.
.3 CSA-O115; Hardwood and Decorative Plywood.
.4 CSA-O112 Series; CSA Standards for Wood Adhesives.
.5 CAN/CSA-O141; Softwood Lumber.
.6 CSA-O151; Canadian Softwood Plywood.
.7 National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber.
.8 National Hardwood Lumber Association (NHLA) Rules for the Measurement and Inspection of Hardwood and Cypress.

1.4 SAMPLES

.1 Submit samples of each type and profile of all standing and running trim, in accordance with Section 01 30 00. Submit samples of finished Carpentry items in the finishes specified for review by the Consultant. Approved samples shall represent the minimum quality of work for this section.

1.5 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 30 00.

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

.3 Indicate all materials, thicknesses, finishes and hardware.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Protect materials against dampness during and after delivery.

.2 Store materials in ventilated areas, protected from extreme changes of temperature or humidity.

2 PRODUCTS

2.1 LUMBER MATERIALS

.1 Softwood Lumber for Concealed Work (interior blocking and furring): AWMAC/AWI QSI - Section 100 Grade 3;

.1 Species: SPF Softwood.

2.2 PANEL MATERIALS

.1 Canadian Softwood Plywood: to CSA-O151, G2S, standard construction, thickness as indicated.

2.3 ACCESSORIES

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

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

.3 Splines: wood or metal.

2.4 ADHESIVES

.1 Contact Adhesive: conforming to CAN/CGSB-71.20.

.2 Hot Melt Adhesive: waterproof type, as approved by the Consultant.

.3 Sealer: water-resistant sealer or glue.

3 EXECUTION

3.1 INSTALLATION

.1 Do finish carpentry to AWMAC/AWI Quality Standards Illustrated (QSI), except where specified otherwise.

.2 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects. Form joints to conceal shrinkage.

.3 Perform door and frame installation in accordance with National Fire Codes, Volume 4, produced by National Fire Protection Association (NFPA) 80.

3.2 CONSTRUCTION

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

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

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

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

3.3 DOOR INSTALLATION

.1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 00.

.2 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows:

.1 Hinge side: 1.0 mm.

.2 Latchside and head: 1.5 mm.

.3 Finished floor top of carpet and thresholds: 13 mm (6 mm at rated doors).

.3 Adjust operable parts for correct function.

3.4 FRAME INSTALLATION

.1 Set frames plumb, square, level and at correct elevation.

.2 Secure anchorages and connections to adjacent construction.

.3 Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support at centre of head for openings over 1200 mm wide. Remove temporary spreaders after frames are built-in.

.4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.

.5 Touch up galvanized finishes damaged during installation with zinc-rich primer.

3.5 INSTALLATION OF FINISH HARDWARE

.1 Install finish hardware in accordance with manufacturer's supplied templates and installation instructions. Where application of finishing hardware has not been done in a first class manner, replace such work.

.2 Adjust all hardware for correct function.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide bituminous dampproofing.

1.3 REFERENCES

.1 ASTM D6506; Specification for Asphalt Based Protection Board for Below-Grade Waterproofing.
.2 CAN/CGSB 37.5; Cement, Plastic, Cutback Asphalt.
.3 CAN/CGSB 37.16; Filled Cutback Asphalt, for Dampproofing and Waterproofing.
.4 CGSB 37-GP-9Ma; Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
.5 CGSB 37-GP-11M; Application of Cutback Asphalt Plastic Cement.
.6 CGSB 37-GP-36M; Application of Filled Cutback Asphalts for Dampproofing and Waterproofing.
.7 CGSB 37-GP-15M; Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.

1.4 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:

.1 Contractor(Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.5 STORAGE AND HANDLING

.1 Provide and maintain dry, off-ground weatherproof storage.

.2 Store materials on supports to prevent deformation. Store materials in accordance with manufacturers written instructions.

.3 Remove only in quantities required for same day use.

1.6 ENVIRONMENTAL CONDITIONS

.1 Do not proceed with work when wind chill effect would tend to set bitumen before proper curing takes place.

.2 Maintain air temperature and substrate temperature at dampproofing installation area above 5°C for 24 hours before, during and 24 hours after installation.

.3 Do not apply dampproofing in wet weather.

.4 Provide forced air circulation during installation and curing periods for enclosed applications.

.5 New concrete shall have cured for a minimum of 14 days prior to application of dampproofing.

2 PRODUCTS

2.1 MATERIALS

.1 Dampproofing: asphalt emulsion compound, to CAN/CGSB 37.2.

.2 Reinforcing Fabric: woven glass fabric; equivalent to Bakor Yellow Jacket, by Henry Company Inc.

.3 Sealing Compound: plastic cutback asphalt cement to CAN/CGSB-37.5.

.4 Protection Board: mineral-fortified asphaltic core, between outside layers of asphalt impregnated fiberglass, 6mm thick, to ASTM D6506, Class B; equivalent to Bakor 990-31 Protection Board by Henry Company Inc.

.5 Acceptable Products

.1 Bakor 700-01 Dampproofing and Waterproofing Asphalt Emulsion, by Henry Company Inc.
.2 SEALMASTIC EMULSION Dampproofing, by WR Meadows of Canada.
.3 MULSEAL Dampproofing, by Tremco Canada Limited.

3 EXECUTION

3.1 PREPARATION

.1 Before applying dampproofing, seal exterior joints between foundation walls and footings, joints between concrete floor slab and foundation and around penetrations through dampproofing with sealing compound, in accordance with CGSB 37-GP-11M.

3.2 APPLICATION

.1 Apply dampproofing in accordance with CGSB 37-GP-12Ma, using brush/spray method, in two (2) coats at right angles to each other, in continuous unbroken film.

.2 Apply two additional coats of dampproofing with reinforcing fabric, to vertical corners and construction joints for a minimum width of 230mm on each side, and all around and for 230mm along pipes passing through walls.

.3 Apply protection board over dampproofing immediately following application. Butt boards together. Cut and fit around all penetrations.

.4 Allow 24 hours between coats and 48 hours before backfilling.

3.3 SCHEDULE

.1 Apply dampproofing to all perimeter foundation walls not covered by waterproofing membrane, as indicated on the drawings.

.2 Apply to entire exterior faces of foundation walls from 50mm below finished grade level, down to and including tops of footings.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 Subcontractors involved in the work of this section shall examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Construction Manager for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide rigid board insulation.

1.3 REFERENCES

.1 CAN/ULC-S102; Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
.2 CAN/ULC-S114; Determination of Non-combustibility of Building Materials.
.3 CAN/ULC-S701; Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
.4 CAN/ULC-S770; Standard for Determination of Long-Term Thermal Resistance of Closed-Cell Thermal Insulation Foams.
.5 CGSB 71-GP-24; Adhesive, Flexible, for Bonding Cellular Polystyrene Insulation.

1.4 SUBMITTALS

.1 Samples: Submit samples of insulation furring system channels, fasteners and accessories, in accordance with Section 01 30 00.

.2 Product Data: Submit manufacturer's printed product literature, MSDS sheets, and application instructions for insulation materials in accordance with Section 01 30 00.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials to the site in their original unopened packages, bearing all manufacturer's labels.

.2 Protect packages from damage, and materials from effects of weathering.

2 PRODUCTS

2.1 INSULATION

.1 Foundation Insulation & General Applications: extruded closed-cell polystyrene foam insulation (XPS), Type 4 to CAN/ULC-S701, shiplapped edges, manufactured using HCFC-free blowing agents, thickness as shown on the drawings, and as follows;

.1 Board size: 600mm x 2400mm.
.2 Compressive strength: 210kPa.
.3 Flame Spread: less than 50, to CAN/ULC-S102.
.4 Vapour Permeance: 90ng/Pa s m^2 maximum.
.5 Long Term Thermal Resistance (LTTR)
.1 (R 5.0) RSI 0.87 per 25mm thickness of board.
.6 Acceptable Products
.1 FOAMULAR®, by Owens-Corning Canada Inc.

.2 Roof Insulation Application: semi-rigid mineral fibre processed from rock, slag, or glass, to CAN/ULC-S702 Type 1, non-combustible to CAN/ULC-S114, thickness as shown on the drawings;
.1 Rockwool CavityRock, by Rockwool LLC.
.2 ThermaFibre RainBarrier 45, by Owens Corning Canada Inc.

2.2 ADHESIVES
.1 For polystyrene: to CGSB 71-GP-24M.

3 EXECUTION

3.1 QUALITY OF WORK
.1 Install insulation after building substrate materials are dry.

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

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

.4 Keep insulation minimum 75mm from heat emitting devices such as recessed light fixtures.

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

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

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

3.2 EXAMINATION
.1 Examine substrates and immediately inform Consultant in writing of defects.

.2 Prior to commencement of work ensure substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris.

3.3 INSTALLATION
.1 General Application
.1 Apply adhesive to substrate by notched trowel in accordance with manufacturer's instructions.

.2 Embed insulation boards into adhesive, prior to skinning of adhesive.

.3 In addition to adhesive. Install mineral fibre insulation boards with insulation clips, 2 per board minimum, fit boards tight, cut off fastener spindle 3mm beyond disc.

.4 Leave unbonded joints in insulation board over line of expansion and control joints.

.2 Roof Application

.1 Cut and fit boards between Z-Girts.

.2 Butt board joints tightly together with joints staggered.

.3 Perimeter Foundation Insulation

.1 Interior Application: extend boards vertically (2'-0") 600mm below finish grade to depths detailed on the drawings. Install on exterior face of perimeter foundation wall with adhesive.

.2 Under slab application: extend boards (2'-0") 600mm in from perimeter foundation wall, where indicated on the drawings. Lay boards on level compacted fill.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide batt and blanket insulation.

1.3 REFERENCES

.1 CSA-B111; Wire Nails, Spikes and Staples.
.2 CAN/ULC-S102; Surface Burning Characteristics of Building Materials and Assemblies.
.3 CAN/ULC-S114; Determination of Non-Combustibility in Building Materials.
.4 CAN/ULC-S702; Standard for Mineral Fibre Thermal Insulation for Buildings.

2 PRODUCTS

2.1 INSULATION

.1 Thermal Insulation: mineral fibre, processed from rock or slag, to CAN/ULC-S702, Type 1; thicknesses as shown on the drawings;
  .1 Thermal Resistance: RSI 0.74/25mm.
  .2 Acceptable Products
    .1 CavityRock™, by Rockwool Group.
    .2 CW8 Mineral Fibre Insulation, by Johns-Manville.
    .3 Thermafiber® RainBarrier 45, by Owens Corning Canada Inc.

.2 Fire Blanket Insulation: mineral fibre processed from rock, slag, or glass, to CAN/ULC-S702 Type 1, non-combustible to CAN/ULC-S114, thickness as shown on the drawings;
  .1 Fire Hazard Classification: flame spread 25 or less, smoke developed 50 or less, to CAN/ULC-S102.
  .2 Thermal Resistance: RSI 0.71/25mm.
  .3 Acceptable Products
    .1 Unfaced Thermal Fiber Glass Insulation, by Johns-Manville.
    .2 Flame Spread 25, by Owens Corning Canada Inc.
    .3 Roxul AFB, by Rockwool Group.

.3 Sound Attenuation Insulation: mineral fibre processed from rock, slag, or glass, to CAN/ULC-S702, Type 1, thickness as shown on the drawings;

.1 Acoustical Performance:
- .1 Airborne sound transmission loss: To ASTM E90.
- .2 Rating sound insulation: To ASTM E413.
- .3 Sound absorption co-efficients: To ASTM E423.
- .4 NRC: 0.95 at 50mm thickness.

.2 Acceptable Products
- .1 Sound Attenuation Batt Insulation, by Owens Corning Canada Inc.
- .2 Roxul AFB, by Rockwool Group.
- .3 Sound-SHIELD® Insulation Batts by Johns-Manville.
- .4 Noise Reducer Sound Attenuation Batt, by CertainTeed Canada .

2.2 ACCESSORIES

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

.2 Tape: CCMC approved, Tuck 20502 Contractor's Sheathing Tape, by Canadian Technical Tape Ltd., Montreal PQ.

3 EXECUTION

3.1 INSULATION INSTALLATION

.1 Install Thermal Insulation to maintain continuity of thermal protection to building elements and spaces.

.2 Where no means of securing is present, retain insulation in position with insulation clips, installed as recommended by manufacturer. Insulation clips shall be spaced 400mm vertically.

.3 Fit insulation closely around electrical boxes, pipes, ducts, frames, and other objects in or passing through insulation. Do not compress insulation to fit into spaces.

.4 Keep insulation minimum 75mm away from heat emitting devices such as recessed light fixtures.

.5 Do not enclose or build over insulation until it has been inspected and approved by Consultant.

.6 Install Sound Attenuation insulation in non fire-rated interior wall assemblies, as shown on the drawings.

.7 Install Ceiling Sound Attenuation insulation in non fire-rated ceiling assemblies, as shown on the drawings. Lay batts loosely over ceiling assembly, butted together.

.8 Install Fire Blanket/Sound Attenuation insulation in all fire-rated interior wall and ceiling assemblies, where indicated as having fire resistance ratings on the drawings.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide all spray-in-place foam insulation/air barrier for cavity wall applications, and other applications as noted or as scheduled on the drawings.

.2 The work of this section includes provision of all transition membranes between dissimilar substrate materials, and all transition membranes between wall and opening frames.

.3 Provide spray-applied thermal barrier coat where required by OBC.

1.3 REFERENCES

.1 ASTM E283; Rate of Air Leakage Through Exterior Windows Curtain Walls and Doors.
.2 CAN/ULC-S102; Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
.3 CAN/ULC-S705.1; Thermal insulation - Spray-Applied Rigid Polyurethane Foam, Medium Density, Material Specification.
.4 CAN/ULC-S705.2; Thermal insulation - Spray-Applied Rigid Polyurethane Foam, Medium Density, Installer's Responsibilities Specification.
.5 CAN/ULC-S770; Determination of Long Term Thermal Resistance of Closed Cell Thermal Insulating Foams.

1.4 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in

accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:

.1 Contractor(Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.5 INSPECTION & TESTING

.1 The work of this Section is subject to inspection and testing as specified in Section 01 40 00 and herein. Allow for independent inspection by an Independent Testing Authority. Costs for inspection and testing will be paid by the Owner.

.2 Conduct tests daily on core density and adhesion/cohesion to the substrate, following procedures established by CUFCA/NECA. Enter all test results in daily report forms provided by CUFCA/NECA. Submit copies of all report forms to Consultant with applications for payment.

.3 Once the curing time required by the transition membrane manufacturer has elapsed, conduct a test to verify adhesion between the membrane and the substrate. Perform all adhesion tests using Com-Ten Industries Series 301N1M equipment or approved alternative. Should adhesion be found to be lower than the required minimum of 110kPa, mechanically fasten the membrane to substrate.

.4 Perform adhesion tests on all corners and building angles, wall to concrete slab, and wall to roof intersections as follows:

.1 One test on every wall less than 30m in length.
.2 Two tests on walls between 30 and 60m in length.
.3 One test every 30m on walls more than 60m in length.
.4 Mechanically fasten membrane where adhesion tests are unable to be performed.

.5 Perform transitions membranes adhesion tests at perimeter openings as follows:

.1 10 openings or more; perform tests on 15% of openings.
.2 10 openings or less; perform tests on 30% of openings.

.6 Perform adhesion tests on transition membranes at every tenth column or beam.

.7 Adhesion tests are not required if membrane is adjusted mechanically.

.8 Permit site access to manufacturer's representative or CUFCA/NECA representative for the purpose of technical assistance or verifying operator certification or the quality of the work.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Materials shall be delivered to jobsite in original and clearly marked containers with manufacturer's labels and seals intact.

.2 Store solvent base liquids away from excessive heat and open flame, at above freezing temperatures, and free from contact with cold or frozen surfaces.

.3 Do not double stack pallets of materials. Provide cover and adequate ventilation.

1.7 TEST RESULTS

.1 Submit copies of all performance test results, as performed by an independent testing laboratory, in accordance with Section 01 30 00.

1.8 MOCK-UP

.1 Construct mock-up of 10m^2 minimum, of spray-in-place foam insulation including one inside corner and one outside corner. Mock-up may be part of finished work.

.2 Allow 48 hours for inspection of mock-up by Consultant before proceeding with insulation work.

.3 Mock-up shall be inspected to verify:

.1 Core Density

.2 Adhesion between transition membrane and substrate

.3 Cohesion/Adhesion between insulation and substrate.

1.9 ENVIRONMENTAL REQUIREMENTS

.1 Provide protection and environmental controls in accordance with Section 01 50 00, and CAN/ULC-S705.2.

.2 Ventilate areas to receive insulation, in accordance with Section 01 50 00, by introducing fresh air and exhausting air continuously during, and for 24 hours after application to maintain non-toxic, unpolluted, safe working conditions.

.3 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.

.4 Protect workers as recommended by insulation manufacturer. Applicator must wear appropriate breathing apparatus, safety goggles, and other protective clothing and equipment.

.5 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.

.6 Apply insulation only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

.7 Dispose of waste foam daily in location designated by Consultant and decontaminate empty drums in accordance with foam manufacturer's instructions.

2 PRODUCTS

2.1 MATERIALS

.1 Sprayed Insulation: spray-applied rigid polyurethane foam to CAN/ULC-S705.1;

.1 Compressive Strength: 222kPa,

.2 Density: 30.4 kg/m^3 minimum.

.3 Flame spread rating: less than 500 to CAN/ULC-S102,
.4 Air leakage of less than 0.001 L/s/m^2 at 75Pa to CAN/ULC-S705.1, per 25mm thickness,
.5 Water Vapour Permeance: 86.6 ng/Pa.s.m^2
.6 Long Term Thermal Resistance (LTTR) of minimum;
.1 1.05m^2 °C/W per 25mm thickness.
.7 Acceptable Products;
.1 WALLTITE ECOv.3, by BASF Canada.
.2 Polar Foam 7300, by Polyurethane Foam Systems Inc.
.3 Heatlok Soy 200 PLus, by Demilec Inc.
.4 Pro Seal MD-C-200v3, by Icynene Inc.

.2 Primers: in accordance with manufacturers recommendations for surface conditions.

.3 Transition Membrane: composite sheet of rubberized asphalt integrally bonded to high density polyethylene film;
.1 Thickness: 19 mils.
.2 Air leakage: less than 0.02 L/s.m^2 @75Pa to ASTM E283.
.3 Water vapour permeance: 1914 ng/Pa.m².s to ASTM E96.
.4 Provide membrane in 102mm, 152mm, 305mm, and/or 1220mm wide rolls as required.
.5 Acceptable Products;
.1 Blueskin SA, by Bakor Inc., or an approved alternative.

.4 Thermal Barrier: non-combustible mineral wool, having Flame Spread Rating of 25 or less in accordance with CAN4-S124 and CAN/ULC-S101-M; "AD Thermal Barrier", by AD Fire Protection Systems, or approved alternative.

3 EXECUTION

3.1 EXAMINATION
.1 Verify that all surfaces to receive spray-in-place insulation are clean and free of all frost, oil, rust, or deleterious materials.

.2 Verify that all environmental conditions required for successful application of materials, can be met.

.3 Report in writing, any defects in surfaces or conditions which may adversely affect the installation or performance of the products provided under this section.

.4 Verify that the following work has been completed prior to insulation installation:
.1 Anchors for masonry
.2 Furring blocking and preparation work for window and door frames.
.3 Air/Vapour Barrier is installed.
.4 Subgirts and/or clip angles for exterior cladding.
.5 Mechanical and electrical work.
.6 Adjacent areas have been protected with drop sheets and /or masing materials.

3.2 PREPARATION
.1 Mask all adjacent surfaces not to receive spray-in-place insulation which may be damaged or stained by insulation installation.

.2 Apply primers where recommended by insulation manufacturer.

3.3 APPLICATION

.1 Apply transition membrane between all surfaces to receive spray foam and all adjecnt materials. Apply at all joints between dissimilar substrate materials. Apply at perimeters of all opening frames, between substrate material and frame.

.2 Apply insulation to clean surfaces in accordance with CAN/ULC-S705.2 and manufacturer's printed instructions.

.3 Apply insulation in consecutive passes not less than 13mm and not more than 50mm thick, for a total thickness scheduled herein.

.4 Finished surface of foam insulation shall be free of voids and imbedded foreign objects.

.5 Avoid overspray of adjacent areas and surfaces.

.6 Finished installation shall be inspected and approved by Consultant prior to concealment.

3.4 TOLERANCES

.1 Maximum variation from specified thicknesses shall not exceed 6mm. Re-apply where cured material does not meet specified thickness or tolerance.

3.5 THERMAL BARRIER

.1 Provide thermal barrier over spray foam insulation where foam is applied in concealed spaces where the air cavity exceeds (1") 25mm in any dimension, in accordance with the requirements of the Ontario Building Code.

.2 Apply thermal barrier spray to minimum (1") 25mm thickness, covering all spray foam insulation in affected areas.

3.6 SCHEDULE

LOCATION	**CURED THICKNESS**
Exterior wall assemblies.	75mm.
All surfaces of steel beams, joists, framing and steel deck in soffit spaces and other unheated areas where shown.	Minimum 75mm thick + Thermal Barrier.
Around mechanical and electrical penetrations at exterior walls.	Fill voids full depth of wall + Thermal Barrier.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide sheet vapour retarders for the following applications:
  .1 Under Concrete Slabs-on-Grade.

1.3 REFERENCES

.1 ASTM D1434; Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting.
.2 ASTM E1745; Specification for Plastic Water Vapor Retrders Used in Contact with Soil or Granular Fill under Concrete Slabs.
.3 ASTM E96/E96M; Test Methods for Water Vapor Transmission of Materials.
.4 ASTM F1249; Test Method for Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.
.5 CAN/CGSB-51.34; Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.
.6 ASTM E2178; Test Method for Air Permeance of Building Materials.

1.4 JOB MOCK-UP

.1 Construct mock-up of sheet vapour retarder installation including one lap joint, one inside corner and at one electrical box.

.2 Notify Consultant when mock-up is complete and allow sufficient time for inspection before proceeding with this work.

.3 If accepted without revision, mock-up will demonstrate minimum standard for this work, and may form part of the finished Work. If rejected, mock-up must be removed, re-built, and re-inspected until approved.

2 PRODUCTS

2.1 SHEET VAPOUR RETARDER

.1 Underslab Application: Polyethylene film, Class A to ASTM E1745, (10mils) 0.25mm thick;
  .1 STEGO WRAP Class A Vapor Retarder, by Stego Industries LLC, as distributed by DRE Industries Inc., Toronto ON.
  .2 PERMINATOR™ by W.R. Meadows of Canada Ltd.

2.2 ACCESSORIES

.1 Joint Sealing Tapes

.1 For Lap Joints: (3-4") 76-100mm wide for lap joints;

.1 STEGO TAPE, by Stego Industries LLC, as distributed by DRE Industries Inc.

.2 PERMINATOR™ TAPE by W.R. Meadows of Canada.

.2 For Perimeter Seals: (2") 51mm wide for perimeter seals to concrete;

.1 StegoTack Tape, by Stego Industries LLC, as distributed by DRE Industries Inc.

.2 PERMINATOR™ TAPE by W.R. Meadows of Canada.

.2 Sealant/Mastic: cold-applied, bituminous/asphalt emulsion, by vapour retarder manufacturer.

3 EXECUTION

3.1 EXAMINATION

.1 Prior to installation of vapour retarder ensure:

.1 All mechanical and electrical service rough-ins below concrete slabs, have been installed, inspected, and approved.

.2 Base course for concrete slab-on-grade is placed, compacted, and has been tested and approved.

3.2 INSTALLATION

.1 Install polyethylene sheet vapour retarder over compacted base prior to installation of concrete to form continuous barrier.

.2 Cut sheet vapour retarder to form around openings and irregular objects and ensure material is lapped and sealed.

.3 Unroll vapour barrier with the longest dimension parallel with the direction of the concrete placement.

.4 Lap vapour barrier up perimeter and seal to foundation walls.

.5 Overlap joints 6 inches and seal with joint tape.

.6 Seal all penetrations (including pipes) per manufacturer’s instructions.

.7 No penetration of the vapour barrier is allowed except for reinforcing steel and permanent utilities. Seal all penetrations with mastic.

.8 Repair damaged areas by cutting patches of vapour barrier, overlapping damaged area (6")152mm and taping all sides with tape. Seal with mastic where required.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide prefinished steel siding, as follows:

.1 Siding stock (face sheets)
.2 Corner and edge trims
.3 Fasteners
.4 Z-girt supports
.5 Sealants
.6 Installation

1.3 SYSTEM DESCRIPTION

.1 Siding Assemblies

.1 Wall assemblies are based on prefabricated metal siding mounted on a Steel Girt/Thermal Spacer subframe fastened to the building substrate. Refer to wall assembly schedules on the drawings.

.1 Wall Assembly **W1** – Siding System

.1 Prefinished metal siding
.2 Galvanized Z-Girts
.3 Sprayed Foam Insulation & AVB Transitions

.2 Design Requirements

.1 Use Limit States Design Principles using factored loads and resistances.

.2 Refer to Structural drawings for loads. Load factors shall be in accordance with the National Building Code of Canada.

.3 Deflection of sheet steel cladding components due to uniformly distributed loads (wind, snow) shall not exceed L/90 of the span for walls.

.3 Performance Requirements

.1 All materials provided under this section shall meet or exceed CSSBI 20M.

.2 Appearance: Concealed fasteners; exposed surfaces free of distortion, twist, waves and buckles.

.3 Structural Loads: resist positive and negative wind pressures expected in this geographical region with a maximum allowable deflection of 1/180 of span. Components shall not vibrate when subjected to the effects of wind.

.4 Moisture control: prevent infiltration of water and snow into wall system. Provide means of draining space between insulation and exterior cladding.

.5 Thermal Movement: accommodate expansion and contraction of component parts without causing buckling, failure of joint seals, undue stress on fasteners and other detrimental effects.

.6 Structural Movement: accommodate movement between wall system and building structure caused by structural movement, without permanent distortion, racking of joints, breakage of seals or water penetration.

1.4 RELATED SECTIONS

.1 Sprayed Insulation & Transition Membranes – Section 07 21 29
.2 Joint Sealants – Section 07 92 00

1.5 REFERENCES

.1 ASTM A653/A653M; Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
.2 ASTM A792/A792M; Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
.3 ASTM A924/A924M; Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
.4 ASTM A1008/A1008M; Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, and High-Strength Low-Alloy with Improved Formability.
.5 ASTM-D523; Test Method for Specular Gloss.
.6 ASTM-D822; Practice for Conducting Tests on Paint and Related Coatings and Materials using Operating Light -and water - Exposure Apparatus (Carbon-Arc Type) for Testing.
.7 ANSI B18.6.4; Screws, Tapping and Metallic Drive, Inch Series, Thread Forming and Cutting.
.8 CSSBI 20M; Standard for Sheet Steel Cladding for Architectural, Industrial and Commercial Building Applications.
.9 CSA S16.1; Steel Structures for Buildings, Limit States Design.
.10 CSA-S136; Cold Formed Steel Structural Members.

1.6 SUBMITTALS

.1 Samples

.1 Submit samples in accordance with Section 01 30 00.

.2 Submit duplicate 300mm x 300mm samples of siding material, of colour and profile specified. Submit sample of standing seam.

.3 Submit full range of colour sample chips.

.2 Shop Drawings

.1 Submit shop drawings in accordance with Section 01 30 00.

.2 Indicate dimensions, profiles, attachment methods, schedule of wall elevations, trim and closure pieces, metal furring, and related work.

1.7 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:

.1 Contractor (Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.8 MOCK-UP

.1 Construct a 1200mm x 1200mm mock-up of the W1 wall assembly on site, where directed by the Consultant. Construct mock-up to include all aspects of assembly including siding panels, support framing, joint treatment, fastening methods, flashing and trim.

.2 Allow minimum 5 working days for review by the Consultant. Correct deficiencies and request subsequent review. Approved mock-up shall serve as the minimum standard of work for the balance of the panel assembly installation.

.3 Approved mock-up may remain as part of the finished Work.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Protect finish and edges in accordance with panel manufacturer's recommendations.

.2 Store material in accordance with panel manufacturer's recommendations.

1.10 EXTENDED WARRANTY

.1 Submit a Warranty Certificate in the name of the Owner, warranting that the finish will not chip, crack, peel or otherwise lose adhesion for a period of forty (40) years from Date of Substantial Performance; and

.2 The Warranty shall state that the finish on the steel siding will not:

.1 chalk in excess of number eight (8) rating as determined by ASTM D4214 Method D659;
.2 change colour more than five (5.0) Hunter ΔE units as determined by ASTM Method D-2244;
.3 for a period of thirty (30) years from Date of Substantial Performance.

2 PRODUCTS

2.1 SYSTEM COMPONENTS

.1 Z-Girts: cold-rolled, commercial grade structural quality sheet steel (SS), minimum (18 gauge) 1.519mm base metal thickness; zinc-coated to ASTM A653/A653M, coating designation Z275.

.2 Flashing & Trim: gauge, coating, and finish to match face sheet. Refer to drawings for details of custom designed trim.

.3 Spray Insulation & Transition Membranes: to Section 07 21 29.

.4 Sealants: to Section 07 92 00.

.5 Fasteners: screws to ANSI B18.6.4, self-drilling, self-tapping, cadmium-plated steel, with colour-matched heads. Use concealed fasteners wherever possible.

.6 Prefinished Steel Sheets

.1 Sheet Steel: Cold-rolled, Grade 230 structural quality sheet steel, to ASTM A924/A924M minimum 22 gauge base metal thickness; Zinc-Coated (Galvanized) & Aluminum-Zinc Alloy Coated (Galvalume) to ASTM A792, coating designation AZ 50. Sheets shall be full height with no intermediate seams.

.2 Finish: system shall be factory-applied on a continuous coil coating line. Top (exposed) side colour coated to dry film thickness of 17.5 to 22.5 microns over 6.25 to 8.75 micron prime coat, for total dry film thickness of 23.75 to 31.25 microns. Bottom (reverse) side primer coated, dry film thickness of 6.25 microns. Finish shall conform to all tests for adhesion, flexibility, and longevity specified by the coating supplier. Strippable film shall be applied to the topside of the painted coil to protect the finish during fabrication, shipping, and field handling.

.1 Bottom (Reverse Side): Silicon-Modified Polyester Paint; factory-applied, thermosetting, 2-coat silicon-modified polyester paint system; colour - primer grey.
.2 Top (Exposed Side): PVDF coating; factory-applied, thermosetting paint system.

.7 Profile/Systems

.1 Siding System:

.1 Profile: 22mm deep, 20 gauge Corrugated by Agway Metals or Vicwest.

.1 Thickness: 0.875mm, (20 gauge).
.2 Colour: as selected by the Consultant.

.8 Flashing and Trim: Profiles and shapes as indicated on the drawings. Material thickness, colour, and finish to match siding sheet.

3 EXECUTION

3.1 EXAMINATION

.1 Air Barrier Transitions

.1 Examine installation, and ensure that it is complete and ready for siding system installation.

.2 Report observed deficiencies to the Consultant prior to commencing installation.

3.2 INSTALLATION

.1 General

.1 Install cladding in accordance with manufacturer's written instructions.

.2 Maintain joints in exterior cladding, true to line, tight fitting, hairline joints.

.3 Attach components in manner not restricting thermal movement.

.2 Installation of sub-framing, and insulation

.1 Install Z-girts after completion and approval of air barrier transition membrane installation, but before rigid insulation installation. Transition membrane by Section 07 21 29

.2 Allow for spray insulation installation by Section 07 21 29.

.3 Installation of Siding

.1 Following insulation installation and acceptance by the Consultant, install cap sheets with colour-matched screws to steel Z-girt support frame.

.2 Install continuous coping, outside corners, edgings, drip-cap, trims and other flashings as indicated, and as required to complete the siding installation.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide pre-finished metal roofing systems for sloped applications.

1.3 REFERENCES

.1 ANSI B18.6.4; Screws, Tapping and Metallic Drive, Inch Series, Thread Forming and Cutting.
.2 ASTM A591/A591M; Specification for Steel Sheet, Electrolytic Zinc-Coated for Light Coating Mass Applications.
.3 ASTM-A653/A653M; Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
.4 ASTM D523; Test Method for Specular Gloss.
.5 ASTM D822; Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.
.6 CSA-S136; Cold Formed Steel Structural Members.
.7 CSA B111; Wire Nails, Spikes and Staples.

1.4 DESIGN CRITERIA

.1 Design complete roof system to withstand dead loads, snow load and build-up, and wind loads including uplift, calculated in accordance with National Building Code of Canada and applicable local regulations or as shown on the drawings.

.2 Design roof panel system to allow for thermal movement of components.

1.5 SYSTEM DESCRIPTIONS

.1 Roof Assembly on Wood Structure
  .1 Roofing Panels.
  .2 Z-Girts / Insulation.
  .3 Air Space
  .4 Moisture Barrier.

1.6 SUBMITTALS

.1 Samples: Submit duplicate 300mm x 300mm samples of siding material, of colour and profile specified in accordance with Section 01 30 00.

.2 Shop Drawings

.1 Submit shop drawings in accordance with Section 01 30 00.

.2 Indicate arrangement of pre-finished roof sheet including joints, types and locations of supports, fasteners, and any special shapes.

.3 Fully detail all components of the system.

.4 Where required by the Authority Having Jurisdiction, each drawing shall bear the signature and stamp of a Professional Engineer registered to practice in the Province of Ontario.

1.7 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:

.1 Contractor (Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.8 WARRANTY

.1 Provide panel manufacturer's written warranty covering failure of factory-applied exterior finish. Warranty period for finish: 20 years from the Date of Substantial Performance. The values below are based on normal environments and exclude any aggressive atmospheric conditions.

2 PRODUCTS

2.1 ROOF SYSTEM COMPONENTS

.1 Moisture Barrier: self-adhering, water resistive, vapour permeable underlayment for metal sloped roofing system; spun-bonded polypropylene, nominal weight 170 g/m^2, nominal thickness 0.6mm, water vapour transmission 119 perms, as per ASTM E96. Acceptable Products are:

.1 SRP AirOutshield ROOF Breathable Underlayment, by SRP Canada, (866-533-0233) www.srpcanada.ca.

.1 Seam Tape: SRP DS Seam Tape (25mm x 15.25m).
.2 Detail Tape: SRP Detail Tape (100mm x 15.25m).

.2 SlopeShield®SA Water-Resistive Roof Underlayment by VaproShield LLC, Gig Harbour WA (866-731-7663) www.vaproshield.com.

.1 VaproTape (Single-Sided): 20 mil thick by 3 inches (76 mm) wide penetration seam tape.
.2 VaproTape UV-Resistant Black: 35 mil thick by 4 inches (102 mm) wide penetration seam tape.

.2 Roof Insulation: Rigid board insulation to Section 07 21 13.

.3 Z-Girts: cold-rolled, commercial grade structural quality sheet steel (SS), minimum (18 gauge) 1.519mm base metal thickness; zinc-coated to ASTM A653/A653M, coating designation Z275.

.4 Prefinished Roof Sheets:
.1 Sheet Steel: Cold-rolled, Grade 230 structural quality sheet steel, to ASTM A924/A924M minimum 0.61mm base metal thickness; Zinc-Coated (Galvanized) to ASTM A653/A653M, coating designation Z275.

.2 Profile: double lock, standing seam, mechanically fastened, (1") 25mm deep, galvanized steel panel, Architectural Panel by Havelock Metals.
.1 Thickness: 0.475mm, (26 gauge).

.2 Finish: Prefinished steel with factory-applied PVDF finish.
.1 Class F1S.
.2 Specular gloss: 30 units +/- in accordance with ASTM D523.
.3 Coating thickness: not less than 22 micrometres.
.4 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20 % to ASTM D822 as follows:
.1 Outdoor exposure period 2500 hours.
.2 Humidity resistance exposure period 5000 hours.
.5 Colour: as selected by the Consultant.

.5 Fascias, Flashing and Trim: Profiles and shapes as indicated on the drawings. Material to match roof sheet; finish to match top (exposed side) finish. Colour to match roof sheets.

.6 Mastic: Single component rubber-based mastic.

2.2 ACCESSORIES
.1 Fasteners: nails to CSA B111, screws to ANSI B18.6.4, purpose made cadmium plated steel.

.2 Sealants: to Section 07 92 00.

2.5 FABRICATION
.1 Fabricate roof components to comply with dimensions, profiles, gauges and details as shown on the shop drawings, including roof, and all required flashings.

.2 Fabricate roof components factory ready for field installation.

3 EXECUTION

3.1 INSTALLATION
.1 General
.1 Install roofing in accordance with manufacturer's written instructions.

.2 Maintain joints in exterior cladding, true to line, tight fitting, hairline joints.

.3 Attach components in manner not restricting thermal movement.

.2 Moisture Barrier Installation

.1 Install moisture barrier membrane over sheathing in shingle fashion. Tape all seams with seam tape.

.2 center horizontally, or as directed by Consultant.

.3 Sub-framing and Insulation

.1 Install Z-girts after completion and approval of air barrier and transition membrane installation, but before insulation installation.

.2 Insulation installation by Section 07 21 13.

.4 Roof Panel Installation

.1 Install exterior pre-finished roof panels using manufacturer's proper construction procedure. Ensure seam caps are positively locked for full length of roof. Field cut miters where applicable and install caps.

.2 Provide notched and formed closures, sealed against weather penetration at ridges under vent. Install ridge vent at ridges as indicated on the drawings.

.5 Flashing Installation

.1 Use concealed fasteners where appropriate. Exposed fasteners to be of same colour as roof sheet.

.2 Lock end joints and caulk to provide weather-tight seal.

3.2 SEALANTS

.1 Caulk joints between roofing and adjacent materials in accordance with Section 07 92 00.

3.3 TOUCH-UP AND CLEANING

.1 Touch up minor paint abrasions with touch-up paint. Clean roof by dry-wiping.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 Subcontractors involved in the work of this section shall examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Construction Manager for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide sheet metal flashing and trim.

1.3 REFERENCE STANDARDS

.1 ASTM A526-M85 Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.
.2 ASTM A591-77 Specification for Steel Sheet, Cold-Rolled, Electrolytic Zinc-Coated.
.3 ASTM D523-85 Test Method for Specular Gloss.
.4 ASTM D822-86 Recommended Practice for Operating Light -and water - Exposure Apparatus (Carbon-Arc Type) for Testing Paint, Varnish, Lacquer and related Products.
.5 CSA B111-1974 Wire Nails, Spikes and Staples.
.6 Canadian Roofing Design-Builders Association.

1.2 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:

.1 Construction Manager (Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)

.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.4 SAMPLES
.1 Submit duplicate 50x50mm samples of each type of sheet metal material, colour and finish in accordance with Section 01 30 00.

2 PRODUCTS

2.1 SHEET METAL MATERIALS
.1 Zinc coated steel sheet: 26ga. thickness, commercial quality to ASTM A653/A653M, with Z275 designation zinc coating.

2.2 PREFINISHED SHEET MATERIALS
.1 Prefinished Steel Sheet Flashing Exposed to View
.1 Prefinished steel with factory-applied polyvinylidene fluoride.
.1 Class F1S.
.2 Colour: to match roofing sheets - Section 07 61 00.
.3 Specular gloss: 30 units +/- in accordance with ASTM D523.
.4 Coating thickness: not less than 22 micrometres.
.5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20 % to ASTM D822 as follows:
.1 Outdoor exposure period 2500 hours.
.2 Humidity resistance exposure period 5000 hours.

.2 Prefinished Steel Sheet Flashing Not Exposed to View
.1 Prefinished steel with factory-applied silicone modified polyester.
.1 Class F1S.
.2 Colour: as selected by Consultant from manufacturer's standard range.
.3 Specular gloss: 30 units +/- 5 in accordance with ASTM D523.
.4 Coating thickness: not less than 20 25 micrometres.
.5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20 % to ASTM D822 as follows:
.1 Outdoor exposure period 500 1000 hours.
.2 Humidity resistance exposure period 500 1000 hours.

2.3 ACCESSORIES
.1 Isolation Coating: alkali resistant bituminous paint.

.2 Plastic Cement: to CGSB 37-GP-5Ma.

.3 Underlay for Metal Flashing: asphalt-laminated 3.6 to 4.5kg kraft paper.

.4 Sealants: in accordance with 07 92 00.

.5 Cleats: of same material, and temper as sheet metal, minimum 50mm wide. Thickness same as sheet metal being secured.

.6 Fasteners: of same material as sheet metal, to CSA B111, self-drilling, self-tapping screws of sufficient length and thickness suitable for application.

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

.8 Touch-up Paint: as recommended by prefinished material manufacturer.

2.4 FABRICATION

.1 Fabricate metal flashings and other sheet metal work as indicated on the drawings and in accordance with CRCA details.

.2 Form pieces in maximum practical lengths. Make allowance for expansion at joints.

.3 Hem exposed edges on underside 12mm. Mitre and seal corners with sealant.

.4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.5 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

2.5 FLASHINGS, REGLETS AND CAP FLASHING

.1 Form flashings, surface mounted reglets and metal cap flashing of 26ga. sheet metal to be built into concrete or masonry work for base flashings as detailed. Provide slotted fixing holes and steel/plastic washer fasteners.

3 EXECUTION

3.1 INSTALLATION

.1 Install sheet metal work in accordance with CRCA FL series details and as detailed on the drawings.

.2 Use concealed fastenings except where approved before installation.

.3 Provide underlay under sheet metal. Secure in place and lap joints minimum 100mm.

.4 Counter-flash roof membrane flashings at intersections of roof with vertical surfaces. Flash joints using S-lock seams forming tight fit over hook strips as detailed.

.5 Lock end joints and caulk with sealant.

.6 Install surface mounted reglets true and level. Turn top edge of flashing 13mm out from surface of reglet.

.7 Caulk flashing at all reglets with sealant.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 Subcontractors involved in the work of this section shall examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Construction Manager for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SUMMARY

.1 Pre-finished metal exterior fascia, soffits, eavestrough and downspouts.

1.3 REFERENCES

.1 ASTM A653/A653M; Steel Sheet, Zinc-Coated (Galvanized) or zinc-iron alloy coated (galvannealed) by the Hot-Dip Process, Physical (Structural) Quality.

.2 CAN/ULC S101; Standard Methods of Fire Endurance Tests of Building Construction and Materials.

.3 CSSBI Technical Bulletin No. 20M; Sheet Steel Cladding for Architectural and Industrial Applications.

1.4 PERFORMANCE REQUIREMENTS

.1 Maximum deflection not to exceed L/180 under system own weight plus wind and suction loads acting normal to plane in accordance with Building Code Climatic Data, wind load 1:30 years.

.2 Provide movement of components without causing buckling, failure of joint seals, undue stress on fasteners when subject to seasonal temperature range, from -40°C to 50°C, and preceding noted wind and suction loads.

.3 Include expansion joints to accommodate movement in system and between soffit system and building structure, where these movements are caused by deflection of building structure. Accommodate these movements, without permanent distortion, damage to infills, racking of joints, breakage of seals, or water penetration.

.4 Provide for positive drainage to exterior of all water entering or condensation occurring within system.

.5 Field Quality Control

.1 The manufacturer's representative and Contractor shall carry out final inspection and approval of completed Work.

1.5 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:

.1 Contractor (Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.6 SUBMITTALS

.1 Submit sample of metal, in selected colour on actual metal base.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Cover pre-finished components to protect surface finishes and insulation core from damage and deterioration.

.2 Store components off ground to prevent twisting, bending or delamination. Slope to shed moisture.

2 PRODUCTS

2.1 MATERIALS

.1 Zinc-Coated Sheet Steel: 26 gauge, minimum base thickness, commercial quality to ASTM A526-80 with Z275 designation zinc coating.

.2 Prefinished Aluminum Sheet: Proprietary utility aluminum sheet, plain, 26 gauge minimum base thickness, with factory-applied light commercial/residential coating to CAN/CGSB-93.1. Colours as selected by Consultant.

.3 Flashing, Trim and Closures: core thickness and finish as for other exposed components.

2.2 SOFFITS

.1 Pre-manufactured soffits: prefinished sheet metal; stamped woodgrain surface texture, (12") 305mm wide, Architectural Panel by Ideal Metals, Vicwest, or approved equivalent. Colour to match roofing sheets specified in Section 07 61 00. Provide panels in perforated and non-perforated styles.

2.3 FASCIAS & EXTERIOR TRIM

.1 Prefinished sheet metal, plain. Colour to match roofing sheets specified in Section 07 61 00.

2.4 EAVESTROUGHS AND DOWNPIPES

.1 Roll-formed, prefinished sheet metal, plain. Colour to match roofing sheets specified in Section 07 61 00.

.2 Sizes and profiles of eavestroughs and downspouts shall be designed and installed as to adequately serve the roof area indicated.

.3 Provide goosenecks, outlets, and necessary brackets and fasteners.

.4 Provide micro-mesh gutter protectors in all new eavestroughs to prevent accumulation of leaves and debris; Architect Gutter Guards by MasterShield Gutter Protection, Patterson NJ or approved equivalent; Colour to match roofing sheets specified in Section 07 61 00.

2.5 METAL FLASHINGS & FASTENINGS

.1 Flashing, 6mm J-Trim, Extruded H-Trim, and Extruded J-Trim: Thickness and finish to match soffit material.

.2 Fastenings: Manufacturer's standard or customs to suit design loads and application.

.3 Sealant: In accordance with Section 07 92 00, type as recommended by manufacturer for specific end use, colour to match cladding.

2.6 FABRICATION

.1 Fabricate metal flashings and other sheet metal work as indicated on the drawings and in accordance with CRCA details.

.2 Fabricate aluminum flashings and other sheet aluminum work in accordance with Aluminum Association Aluminum Sheet Metal Work in Building Construction.

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

.4 Hem exposed edges on underside 12mm. Mitre and seal corners with sealant.

.5 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.6 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

3 EXECUTION

3.1 FASCIA & SOFFITS

.1 Install fascia with colour matched fasteners in longest possible continuous lengths. Overlap ends and seal.

.2 Install soffit panels interlocked with colour-matched fasteners.

3.2 EAVESTROUGHS AND DOWNPIPES

.1 Install eaves troughs and secure to building at 750mm o.c. with eaves trough spikes through spacer ferrules. Slope eaves troughs to downpipes as indicated. Minimum slope 1%. Provide end caps and seal all joints watertight.

.2 Install downpipes and provide goosenecks back to wall. Secure downpipes to wall at 1800mm o.c., minimum two straps per downpipe.

.3 Install gutter protectors in all eavestroughs (gutters).

3.3 ADJUSTING AND CLEANING

.1 Remove all excess materials, debris and equipment at completion.

.2 Clean all surfaces clean and free of all grime and dirt.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide firestop products and systems intended to act as a firestop and smoke seal within fire resistive wall and floor assemblies.

.2 Firestop systems shall be used in locations including, but not limited to, the following:

.1 Penetrations through fire resistance rated floor and roof assemblies including both empty openings and openings containing penetrants.

.2 Penetrations through fire resistance rated wall assemblies including both empty openings and openings containing penetrants.

.3 Membrane penetrations in fire resistance rated wall assemblies where items penetrate on side of the barrier.

.4 Joints between fire resistance rated assemblies.

.5 Perimeter gaps between rated floors/roofs and an exterior wall assembly.

.3 Firestops and smoke seals within mechanical and electrical assemblies (i.e. inside ducts, dampers and bus ducts) shall be provided as part of the work of those trades.

.4 Firestops and smoke seals around the outside of such mechanical and electrical assemblies, where they penetrate fire separations, shall form part of the work of this section.

.5 Firestop systems provide for the Work must be from one manufacturer only.

1.3 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:

.1 Contractor (Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.4 REFERENCE STANDARDS

.1 ASTM E84-01; Standard Test Method For Surface Burning Characteristics of Building Materials.
.2 ASTM E119; Methods of Fire Tests of Building Construction and Materials.
.3 ASTM E814-00; Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
.4 ASTM E1399-97 (2000); Test Method for Cyclic Movement and Measuring Minimum and Maximum Joint Width.
.5 ASTM E1966-00; Test Method For Resistance of Building Joint Systems.
.6 UL 263; Fire Tests of Building Construction and Materials.
.7 UL 723; Surface Burning Characteristics of Building Materials.
.8 UL 1479; Fire Tests of Through-Penetration Fire Stops.
.9 UL 2079; Tests for Fire Resistance of Building Joint Systems.
.10 ULC-S115-1995 (R2001); Fire Tests of Firestop Systems.
.11 CAN/ULC-S102-1988 (R2000); Surface Burning Characteristics of Building Materials and Assemblies.
.12 Underwriters Laboratories of Canada; List of Equipment and Materials - Fire Resistance.
.13 Underwriters Laboratories Inc.; Fire Resistance Directory – Volume 2.
.14 Intertek Testing Services; Directory of Listed Building Products.
.15 Factory Mutual Research (FM); FM Approval Standard of Firestop Contractors – Class 4991.
.16 Omega Point Laboratories (OPL); Building Products, Materials & Assemblies – Volume II.

1.5 DEFINITIONS

.1 Firestop: The use of a material or combination of materials in a fire-rated structure (wall or floor) where it has been breached, so as to restore the integrity of the fire rating on that wall or floor.

.2 System: The use of a specific firestop material or combination of materials in conjunction with a specific wall or flow construction type and specific penetrant(s).

.3 Barrier: Any bearing or non-bearing wall or floor that has an hourly fire and smoke rating.

.4 Through-Penetration: Any penetration of a fire-rated wall or floor that completely breaches the barrier.

.5 Membrane-Penetration: Any penetration in a fire-rated wall that breaches only one side of the barrier.

.6 Fire Resistive Joint: Any gap, joint, or opening, whether static or dynamic, between two fire rated barriers including where the top of a wall meets a floor; wall edge to wall edge applications; floor edge to floor edge configurations; floor edge to wall.

.7 Perimeter Barrier: Any gap, joint, or opening, whether static or dynamic, between a fire-rated floor assembly and a non-rated wall assembly.

1.6 PERFORMANCE REQUIREMENTS

.1 Penetrations: Provide through-penetration firestop systems that are produced and installed to resist the spread of fire, passage of smoke and other hot gases according to requirements indicated, to restore the original fire-resistance rating of assembly penetrated.

.2 Provide and install complete penetration firestop systems that have been tested and approved by nationally accepted testing agencies per ASTM E814, UL 1479, or ULC-S115 fire tests in a configuration that is representative of field conditions.

.3 F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, to ASTM E814, UL 1479, or ULC-S115 but not less than one (1) hour or the fire resistance rating of the assembly being penetrated.

.4 FT-Rated Systems: Provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, to ASTM E814, UL 1479, or ULC-S115, where required by the Building Code.

.5 FH-Rated Systems: Provide through-penetration firestop systems with H-ratings indicated, as well as F-ratings, to ASTM E814, UL 1479, or ULC-S115, where required by the Building Code.

.6 FTH-Rated Systems: Provide through-penetration firestop systems with H-ratings indicated, as well as F-ratings and T-ratings, to ASTM E814, UL 1479, or ULC-S115, where required by the Building Code.

.7 For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.

.8 For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

.9 Fire Resistive Joints: Provide joint systems with fire resistance assembly ratings indicated, as determined by UL 2079 (ASTM E1399 and E1966), but not less than the fire resistance assembly rating of the construction in which the joint occurs. Firestop assemblies must be capable of withstanding anticipated movements for the installed field conditions.

.10 For firestop assemblies exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.

.11 For floor penetrations exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.

.12 Firestop products shall have flames spread ratings less than 25 and smoke-developed ratings less than 450, to ASTM E 84 or CAN/ULC-S102.

.13 Where there is no specific third party tested and classified firestop system available for an installed condition, the firestop contractor shall obtain from the firestop material manufacturer an Engineering Judgment (EJ) to be submitted to the Consultant and authorities having jurisdiction for approval prior to installation. The EJ shall follow International Firestop Council (IFC) guidelines.

1.7 MOCK-UP

.1 Prepare sample joints for approval by the Consultant, representative of each type of firestop condition in accordance with Section 01 30 00.

.2 Where not approved by the Consultant, remove and replace sample joints to the satisfaction of the Consultant.

.3 Approved installations may become part of the finished work.

1.8 SUBMITTALS

.1 Consolidated List: Provide a consolidated list of all firestopping Products to be used for the Project, and their applications, including all those provided by Mechanical and Electrical Subcontractors.

.2 Product Data: For each type of firestop product selected. Certify that firestop materials are asbestos free and contain volatile organic compounds (VOC's) within limits of the local jurisdiction.

.3 Design Listings: Submit system design listings, including illustrations, from a qualified testing and inspecting agency that is applicable to each firestop configuration.

.4 Where there is no specific third party tested and classified firestop system available for a particular configuration, the firestop contractor shall obtain from the firestop material manufacturer an Engineering Judgment (EJ) for submittal.

.5 Qualification Data: For firms and persons specified under Quality Assurance to demonstrate their capabilities and experience. Submit document from manufacturer wherein manufacturer recognizes the installer as qualified.

1.9 ENVIRONMENTAL CONDITIONS

.1 Install firestops when ambient or substrate temperatures are within limits permitted by the manufacturer’s written instructions. Do not install firestops when substrates are wet due to rain, frost, condensation, or other causes.

.2 Ventilate per the manufacturers written instructions on the product’s Material Safety Data Sheet.

1.10 COORDINATION

.1 Coordinate construction of openings and penetrating items to ensure that firestop assemblies are installed according to specified requirements.

.2 Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.

.3 Do not conceal firestop installations until the Owner's inspection agency or Authorities Having Jurisdiction have examined each installation.

.4 Schedule firestop work after installation of penetrants but prior to concealing the openings.

1.11 EXTENDED WARRANTY

.1 Submit a warranty for the firestopping and smoke seals specified in this Section covering a period of three (3) years from date of Substantial Performance of the Contract, including materials and application. Replacement of firestop shall include removal of defective materials, preparation for and application of new material, and the repair and making good of damaged adjacent materials.

.2 "Defective" firestop installation shall include; joint leakage, hardening, cracking, crumbling, melting, bubbling, shrinkage, running, sagging, loss of adhesion, loss of cohesion, and staining of adjacent finished materials or surfaces.

2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

.1 3M Fire Protection Products
.2 A/D Fire Protection
.3 Hilti Firestop Systems
.4 Grace Construction Products
.5 TREMstop Firestopping Systems

2.2 MATERIALS

.1 Firestop And Smoke Seal Systems: in accordance with ASTM E814, UL 1479, or ULC-S115, asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke, and gases to ASTM E814, UL 1479, or ULC-S115, and not to exceed opening sizes for which they are intended.

.2 Service Penetration Assemblies: certified in accordance with ASTM E814, UL 1479, or ULC-S115 and listed in testing laboratory directory.

.3 Service Penetration Firestop Components: certified in accordance with ASTM E814, UL 1479, or ULC-S115 and listed in testing laboratory directory.

.4 Fire resistance rating of installed firestop assemblies shall be in accordance with design requirements, and requirements of Ontario and National Building Codes.

.5 Primers: to Firestop manufacturer's recommendation for specific material, substrate, and end use.

.6 Intumescent Firestop Sealants and Caulks

.1 Grace FlameSafe FS1900.
.2 Hilti FS-One.
.3 A/D FIREBARRIER Intumescent Caulk.
.4 3M Fire Barrier CP 25WB+ Caulk.
.5 TREMstop IA by, TREMstop Firestopping Systems.

.7 Elastomeric Sealant
- .1 Grace FlameSafe FS1900, FS900+.
- .2 Hilti CP601S.
- .3 A/D FIREBARRIER Seal/Seal NS.
- .4 3M Fire Barrier Sealant 2000 and 2000N/S.
- .5 Fyre-Sil/Fyre-Sil S/L by, TREMstop Firestopping Systems.

.8 Joint Spray
- .1 Grace FlameSafe FS3000.
- .2 Hilti CP672.
- .3 A/D FIREBARRIER SprayMastic.
- .4 3M FireDam Spray 200.
- .5 TREMstop Acrylic SP by, TREMstop Firestopping Systems.

.9 Firestop Putty
- .1 Grace FlameSafe FSP1000 Putty & FSP1077 Putty Pads.
- .2 Hilti CP617/617L Putty Pads, & CP618 Putty Stick.
- .3 A/D FIREBARRIER Putty.
- .4 3M Fire Barrier Moldable Putty+.
- .5 TREMstop MP by, TREMstop Firestopping Systems.

.10 Firestop Devices
- .1 Grace FlameSafe FSWSD Collar, FSIS Intumescent Sleeve.
- .2 Hilti CP642/643 Collar.
- .3 A/D FIREBARRIER Collar/Sleeve.
- .4 3M Fire Barrier RC-1 Restricting Collar.
- .5 Fyre-Can/Fyre-Can Sleeve by, TREMstop Firestopping Systems.

.11 Wrap Strips
- .1 Grace FlameSafe FSWS 100/150.
- .2 Hilti CP645.
- .3 AD FIREBARRIER Wrap Strip.
- .4 3M FS-195+.
- .5 TREMstop WS by, TREMstop Firestopping Systems.

.12 Firestop Mortars
- .1 Grace FlameSafe FSM Mortar.
- .2 Hilti FS635 Trowelable Compound.
- .3 A/D FIREBARRIER Mortar.
- .4 3M Fire Barrier Mortar.
- .5 TREMstop Fire Mortar by, TREMstop Firestopping Systems.

.13 Firestop Bags/Pillows/Blocks
- .1 Grace FlameSafe Bags, FlameSafe Pillows.
- .2 Hilti FS657 Fire Block.
- .3 AD FIREBARRIER Pillows.
- .4 3M Fire Barrier Pillows.
- .5 TREMstop PS by, TREMstop Firestopping Systems.

.14 Forming/Damming Materials: Mineral Wool or other type as per manufacturer's recommendations.

.15 Accessories: Provide components for each firestop system that are needed to install fill materials and to comply with Performance Requirements. Use only approved components specified by the firestop manufacturer for the firestop systems indicated. Accessories include, but are not limited to the following items:
- .1 Permanent forming/damming/backing materials, including the following:
- .2 Mineral wool fiber insulation.
- .3 Foams or sealants used to prevent leakage of fill materials in liquid state.
- .4 Fire-rated form board.
- .5 Polyethylene/polyurethane backer rod.
- .6 Rigid polystyrene board, and other temporary forming materials.
- .7 Substrate primers.
- .8 Steel sleeves.

.16 All firestop products and systems shall be designed and installed so that the basic sealing system will allow the full restoration of the thermal and fire resistance properties of the barrier being penetrated with minimal repair if penetrants are subsequently removed.

2.3 MIXING

.1 For those products requiring mixing before application, comply with firestop manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

3 EXECUTION

3.1 EXAMINATION

.1 Examine substrates and conditions for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.

.2 Proceed with installation only after unsatisfactory conditions have been corrected.

.3 Verify that all pipes, conduits, cables, and/or other items which penetrate fire-rated construction have been permanently installed prior to installation of firestops.

3.2 PREPARATION

.1 Surface Cleaning: Clean out openings immediately before installing firestop systems to comply with written recommendations of firestop manufacturer and the following requirements:
- .1 Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of firestop systems.
- .2 Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestop systems. Remove loose particles remaining from cleaning operation.
- .3 Remove laitance and form-release agents from concrete.

.2 Firestop shall be installed before fireproofing where bonding of firestop to metal deck is required.

.3 Firestop must precede installation of insulation around pipes and ducts penetrating fire separation.

.4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces.

3.3 INSTALLATION

.1 General

.1 Install firestop and smoke seal material and components in accordance with certification and manufacturer's instruction.

.2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separations.

.3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength to maintain their integrity.

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

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

.2 Penetration Firestop Systems

.1 Install through-penetration firestop systems to comply with Performance Requirements in Part 1 and firestop manufacturer’s written installation instructions and published drawings for products and applications indicated.

.2 Apply firestops in accordance with listed system designs or manufacturer’s EJ per the manufacturer’s installation instructions.

.3 Install forming/damming/backing materials and other accessories required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire resistance ratings required.

.4 Install fill materials for firestop systems by proven techniques to produce the following results:

.1 Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.

.2 Apply materials so they fully contact and adhere to substrates formed by openings and penetrating items.

.3 For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

.3 Joint Firestop Systems

.1 Install fire resistive joint firestop systems to comply with Performance Requirements in Part 1 and firestop manufacturer’s written installation instructions and published drawings for products and applications indicated.

.2 Apply firestops in accordance with listed system designs or manufacturer’s EJ per the manufacturer’s installation instructions.

.3 Install joint forming/damming materials and other accessories required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths of installed firestop material relative to joint widths that allow optimum movement capability and achieve fire resistance ratings required.

.4 Install fill materials for firestop systems by proven techniques to produce the following results:
- .1 Fill joint as required to achieve fire-resistance ratings indicated.
- .2 Apply materials so they fully contact and adhere to substrates forming the openings.
- .3 Completely fill recesses provided for each joint configuration.
- .4 Tool non-sag firestop materials after their application and prior to the time skinning begins. Use tooling agents approved by the firestop manufacturer.

.4 Perimeter Barrier Firestop Systems

.1 Install perimeter barrier firestop systems to comply with Performance Requirements in Part 1 and firestop manufacturer's written installation instructions and published drawings for products and applications indicated.

.2 Apply firestops in accordance with listed system designs or manufacturer's EJ per the manufacturer's installation instructions.

.3 Install metal framing, curtain wall insulation, mechanical attachments, safing materials and firestop materials as applicable within the system design.

3.4 INSPECTION

.1 Notify Consultant when installation is complete and ready for inspection, and prior to concealing or enclosing firestop materials and service penetration assemblies.

3.5 TOLERANCES

.1 The following shall regulate sizing of service penetrations:

.1 Mechanical and Electrical shall sleeve single, circular penetrants, except in fire resistance rated gypsum board.

.2 Multiple penetrations of circular penetrants shall be considered such if the penetrants are not further than 102mm apart.

.3 Forming of multiple penetrations and single penetrants in fire resistance rated gypsum board assemblies shall be created by respective trades by forming a square or rectangular opening around the penetrants. The edges of the opening shall be covered in gypsum board

.4 Perimeter clearance shall be 13mm to 25mm for single penetrants, or 13mm to 25mm around outer penetrants in multiple penetrations.

.5 Penetrations of square or rectangular configuration shall be constructed as specified above. Perimeter clearance shall be 40 to 50mm.

3.6 SCHEDULE

.1 Non-Service Penetrations Through Vertical Fire Separations Consisting Of Masonry, Concrete, Or Gypsum Board/Stud Construction;
- .1 Elastomeric seal and backup/forming material.
- .2 Firestop system rating: **F**.

.2 Edge Of Floor Slabs At Curtain Wall Or Precast Concrete Panel Assemblies;
- .1 Self-leveling elastomeric seal and backup/forming material.
- .2 Firestop system rating: **F**.

.3 Voids At Perimeter Edges Of Vertical Fire Separations Consisting Of Masonry, Concrete, Or Gypsum Board/Steel Stud Construction;
- .1 Elastomeric seal and backup/forming material.
- .2 Firestop system rating: **F**.

.4 Intersection Of Masonry And Gypsum Board/Steel Stud Fire Separations;
- .1 Elastomeric seal and backup/forming material.
- .2 Firestop system rating: **F**.

.5 Control And Deflection Joints In Fire Separations;
- .1 Elastomeric seal and backup/forming material.
- .2 Firestop system rating: **F**.

.6 Non-Service Penetrations Through Horizontal Fire Separations And Fire-Resistance Rated Floor Slabs, Ceilings, And Roofs;
- .1 Self-leveling elastomeric seal and backup/forming material.
- .2 Firestop system rating: **F**.

.7 Openings And Sleeves Installed For Future Use In Fire Separations;
- .1 Elastomeric seal and backup/forming material.
- .2 Firestop system rating: **FH**.

.8 Service Penetrations Around Mechanical Ductwork And Noncombustible Piping, Rigid Electrical Conduit And Other Assemblies Penetrating Fire Separations;
- .1 Elastomeric seal and backup/forming material.
- .2 Firestop system rating: **F**.

.9 Service Penetrations Around Mechanical Ductwork And Noncombustible Piping, Rigid Electrical Conduit And Other Assemblies Penetrating Firewalls;
- .1 Elastomeric seal and backup/forming material.
- .2 Firestop system rating: **FT**.

.10 Service Penetrations Around Combustible Piping Penetrating Fire Separations;
- .1 Intumescent mastic collar.
- .2 Firestop system rating: **F**.

.11 Service Penetrations Around Multiple Flexible Cables Penetrating Fire Separations;
- .1 Removable intumescent bags/pillows, or intumescent cable sleeve systems.
- .2 Firestop system rating: **FT**.

3.7 CLEANUP

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

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide caulking and sealing of joints between building components, including joint preparation.

.1 Exterior Joints

.1 Perimeter of metal frames in exterior walls
.2 Joints between dissimilar materials
.3 Full length of door thresholds
.4 Control and expansion joints

.2 Interior Joints

.1 Perimeter of metal frames in interior walls
.2 Joints between dissimilar materials
.3 Full length of door thresholds
.4 Control and expansion joints
.5 Perimeter of plumbing fixtures
.6 Perimeter of fixed equipment
.7 Acoustic sealants

1.3 REFERENCE STANDARDS

.1 ASTM C920; Standard Specification for Elastomeric Joint Sealants.
.2 CAN/CGSB-19-GP-5M; Sealing Compound, One Component, Acrylic Base, Solvent Curing.
.3 CAN/CGSB-19-GP-14M; Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.
.4 CAN/CGSB-19.17; Sealing Compound, One Component, Acrylic Emulsion Base.
.5 CAN/CGSB-19.13; Sealing Compound, One Component, Elastomeric, Chemical Curing.
.6 CAN/CGSB-19.24; Sealing Compound, Multi-Component, Chemical Curing.

1.4 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in

the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:

.1 Contractor (Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.5 MOCK-UP

.1 Test sealant in contact with samples of materials to be caulked to ensure that proper adhesion will be obtained and no staining of the material will result. Prepare sample joints at the site of each type of sealant for each joint condition, for each and every colour, to provide mock-up as specified in Section 01 30 00.

1.6 SUBMITTALS

.1 Submit samples of sealants and backing materials.

.2 Submit product list with manufacturer's product name for each sealant to be used for this project, along with recommendations for use of the sealant, before commencing joint sealing.

1.7 ENVIRONMENTAL CONDITIONS

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

1.8 EXTENDED WARRANTY

.1 Submit a warranty for the work of this Section for a period of three (3) years from the Date of Substantial Performance, including materials and application.

.2 Replacement of joint sealants shall include removal of defective materials, preparation for and application of new material, and the repair and making good of damaged adjacent materials.

.3 Defective joint sealant installation shall include, but not be restricted to, joint leakage, hardening, cracking, crumbling, melting, bubbling, shrinkage, running, sagging, change of colour, loss of adhesion, loss of cohesion, and staining of adjoining of adjacent materials or surfaces.

2 PRODUCTS

2.1 MATERIALS

.1 All materials utilized in a sealant system shall be compatible and non-staining.

.2 Specified proprietary products are minimum acceptable quality. Products of other manufacturers of equal or superior quality will be acceptable where specifically approved by Consultant.

.3 Provide sealant formulation recommended by manufacturer for type of joint, substrate and service conditions applicable.

2.2 SEALANTS

.1 Refer to Caulking Schedule for utilization of the following sealants:

.1 **Sealant Type 1:** Multi-component, chemical-cure polyepoxide polyurethane sealant, to ASTM C920, Type M, Grade NS, Class 25, Use T, NT, M, G, A, and O; colours as selected by the Consultant;

.1 "DYMERIC 240" by Tremco (Canada) Ltd.
.2 "PRC Rubber Calk 270", by PRC Canada Inc.
.3 "SikaFlex 2c NS", by Sika Canada Inc.
.4 "Sonnenborn Sonnolastic® NP 2™", by BASF Building Materials.
.5 "Dynatrol® II", by Pecora Corporation.

.2 **Sealant Type 2:** One-part, moisture-cure (fast cure) polyurethane sealant, to CAN/CGSB-19.13, Classification MC-2-25-B-N; colours as selected by the Consultant;

.1 DYMONIC FC or Vulkem 116, by Tremco (Canada) Ltd.
.2 "Dynatrol® I-XL", by Pecora Corporation.
.3 "Sonnenborn Sonnolastic® NP 1™", by BASF Building Materials.

.3 **Sealant Type 3:** One-part, acrylic latex sealant, to CAN/CGSB-19-GP-5M;

.1 "TREMFLEX® 834", by Tremco (Canada) Ltd.
.2 "RCS20 Acrylic Urethane", by GE Advanced Materials.
.3 "AC20™", by Pecora Corporation.

.4 **Sealant Type 4:** to ASTM C920, Type S, Grade NS, Class 25, Use NT, G, A, and O, one component acetoxy silicone containing non-toxic fungicidal agents; colours as selected by the Consultant. Acceptable products are:

.1 "Dow Corning® 786", by Dow Corning Canada Limited.
.2 "Sanitary SCS1700", by GE Advanced Materials.
.3 "Tremsil® 200", by Tremco (Canada) Ltd.
.4 "Sonnenborn OmniPlus™", by BASF Building Materials.

.5 **Sealant Type 5:** One-part, medium modulus, neutral cure silicone sealant, to CAN/CGSB-19.13, Classification MCG-2-25-A-L;

.1 SPECTREM® 2, by Tremco (Canada) Ltd.
.2 "Dow Corning® 795", by Dow Corning Canada Limited.

.6 **Sealant Type 6:** One-part, non-skinning, non-hardening, synthetic rubber acoustical sealant, to CGSB 19-GP-14M;

.1 "Tremco Acoustical Sealant", by Tremco (Canada) Ltd.
.2 "BC-158", by Pecora Corporation.

.7 **Sealant Type 7:** One-part, low modulus, non-staining, neutral-cure silicone sealant, to CAN/CGSB-19.13; colour as selected by the Consultant;

.1 "SPECTREM® 1", by Tremco (Canada) Ltd.
.2 "CSL-343", by CSL Silicones Inc.

.8 **Sealant Type 8:** One-part, low modulus, non-staining, neutral-cure silicone sealant, to CAN/CGSB-19.13; colour as selected by the Consultant;
- .1 "SPECTREM® 3", by Tremco (Canada) Ltd.
- .2 "Dow Corning® 791", by Dow Corning Canada Limited.
- .3 "Silpruf* SCS 2000", by GE Advanced Materials.
- .4 "Sika-Sil®C 995", by Sika Canada Inc.
- .5 "Sonnenborn Omniseal 50™", by BASF Building Materials.
- .6 "864" by Pecora.

.2 Colours of sealants will be selected by the Consultant from manufacturers full available ranges of colour.

2.3 ACCESSORIES

.1 Primer: Type recommended by sealant manufacturer.

.2 Backer Rods: 30% greater diameter than joint width, with Shore-A hardness of 20, and 830-900Kpa tensile strength;
- .1 Vertical Surfaces: extruded polyolefin rod; SofRod by Tremco Canada (div. of RPM Canada).
- .2 Horizontal Surfaces: closed cell polyethylene rod; Standard Backer Rod by Tremco Canada (div. of RPM Canada).

.3 Bond Breaker: pressure sensitive plastic tape, for installation where minimum specified depth of joint is unobtainable; 3M #266/#481, or Valley Industries #40.

3 EXECUTION

3.1 EXAMINATION

.1 Before commencing joint sealing, verify at the site that joint configuration and surfaces have been provided as specified in other Sections to meet intent of sealant specification.

.2 Verify that joint conditions will not adversely affect execution, performance or quality of completed sealed joints, and that they can be put into acceptable condition by means of preparation specified in this Section. If in doubt, verify site conditions together with manufacturer's representative of the sealant to be applied.

.3 Verify that sealers and coatings applied to sealant substrates are compatible with the sealant used and that full bond between sealant and substrate is attained. Request samples of the sealed or coated substrate from their fabricators for testing of compatibility and bond if necessary.

.4 Verify that specified environmental conditions are ensured before commencing joint sealing.

.5 Defective sealed joints resulting from application to unsatisfactory joint conditions will be considered the responsibility of this Section.

.6 Examine joint sizes for anticipated movement, and for proper width/depth ratio per manufacturer's recommendations for specified sealant.

3.2 PREPARATION

.1 Remove loose mortar, dust, oil, grease, oxidation, mill scale, coatings and all other materials affecting bond of compounds from surfaces to which sealant compounds must adhere, except for painted surfaces, by brushing, scrubbing, scraping or grinding.

.2 Clean down caulked metal surfaces with clean cellulose sponges or rags soaked in solvent recommended by sealant manufacturer, and wipe dry with clean cloths. Ensure that solvent is not injurious to painted surfaces.

.3 Use methods of preparation suitable for substrate as recommended by sealant manufacturer, and that does not damage adjacent surfaces.

.4 Ensure that releasing agents, coatings or other treatments have either not been applied to joint surfaces, or that they are entirely removed.

.5 Where necessary to protect adjacent surfaces, mask adjacent surfaces with tape prior to priming and/or caulking.

3.3 APPLICATION

.1 Except where specified in other Sections, seal open joints in surfaces exposed to view, and to make the building weather-tight and airtight as applicable; as indicated typically on the Drawings, and as otherwise specified and instructed by Consultant. Refer to Caulking Schedule at the end of this section.

.2 Prime surfaces to receive sealants as required by substrate and manufacturer's specifications to ensure positive and permanent adhesion, and to prevent staining.

.3 Pack joints tightly with backer rod set at depth specified for sealant. Fill other voids with filler.

.4 Install joint backing material or apply bond breaker tape to achieve correct joint depth and prevent three-sided adhesion. Install bond breaker tape in bottom of joints in lieu of sealant backing where proper depth cannot be obtained when backing is installed.

.5 Maintain depth of sealant as follows:

JOINT WIDTH	JOINT DEPTH
6mm (minimum)	6mm
6 to 13mm	depth = joint width
13 to 20mm	depth = ½ joint width

.6 Maximum widths of joints are as follows:
- .1 Exterior: 20mm.
- .2 Interior: 10mm.

.7 Perform joint sealing in accordance with compound manufacturer's specifications, under manufacturer's supervision, and using pressure guns and other equipment as approved by the manufacturer.

.8 Finish joints with a full bead so that they are smooth; and free from ridges, wrinkles, air pockets and embedded foreign materials. Tool surface of joints to a slight concave profile.

.9 Caulk joints in site-painted materials after surfaces have been prime painted.

.10 Do not allow sealants to cover or spot surfaces outside of joints. Use masking tape protection to prevent coating of adjacent surfaces if necessary.

.11 All work shall be performed in accordance with manufacturer's specifications for sealants specified.

3.4 CLEANING

.1 Remove sealant smears and droppings, and masking tape immediately on completion of joint sealing.

.2 Do not use chemicals, scrapers, or other tools, which would damage surfaces from which excess compounds, or droppings are removed. Make good materials damaged by cleaning by the installer of the damaged material and at the expense of this Section.

3.5 CAULKING SCHEDULE

Sealant Type 1 or 2	• Interior joints between dissimilar materials. • Interior joints at perimeter of all built-in equipment. • Interior joints at perimeter of metal door and window frames.
Sealant Type 3	• Interior non-movement joints 6mm or less for painting (painter's caulk).
Sealant Type 4	• Interior joints where mildew resistance is required. • Interior joints at perimeter of all plumbing fixtures • Interior joints between counter backsplash and wall surfaces.
Sealant Type 5	• Glass to glass joints. • Glass to metal joints. • Metal to metal curtain wall joints.
Sealant Type 6	• Perimeter of all gypsum board partitions and metal screens, where sound insulation is indicated. • All vapour barrier seams and seals.
Sealant Type 7	• High Movement Joints (expansion).
Sealant Type 8	• Exterior joints between dissimilar building veneer materials. • Exterior control joints in building veneers. • Exterior joints at perimeter of all door and window frames.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to supply all steel (hollow metal) doors, frames, and screens.

.2 This section shall provide all factory fabrication, hardware preparation, and accessories specified herein.

1.3 REFERENCE STANDARDS

.1 ASTM A1008/A1008M; Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, and High-Strength Low-Alloy with Improved Formability.
.2 ASTM A653/A653M; Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
.3 ASTM A924/A924M; Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
.4 ANSI/BHMA A156 Series; Hardware.
.5 CSA-G40.20/G40.21; General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
.6 CSA W59; Welded Steel Construction (Metal Arc Welding).
.7 CAN4-S104; Fire Tests of Door Assemblies.
.8 CAN4-S105; Fire Door Frames.
.9 CAN/ULC-S102; Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
.10 CAN/ULC-S702; Standard for Mineral Fibre Thermal Insulation for Buildings.
.11 CAN/ULC-S704; Standard for Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced.
.12 CAN/ULC-S770; Standard for Determination of Long-Term Thermal Resistance of Closed-Cell Thermal Insulation Foams.
.13 Canadian Steel Door and Frame Manufacturers' Association, (CSDFMA) Canadian Manufacturing Specifications for Steel Door and Frames, 1990.
.14 CAN/CGSB-1.181; Ready Mixed Organic Zinc-Rich Coating.
.15 CGSB 41-GP-19Ma; Rigid Vinyl Extrusions for Windows and Doors.
.16 NFPA-80; Fire Doors and Fire Windows.
.17 UL Building Materials Directory.
.18 ULC List of Equipment and Materials, Volume 2.

.19 ITS/WH Certification Listings.

1.4 REQUIREMENTS OF REGULATORY AGENCIES

.1 Steel fire rated doors and frames shal be labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104 and CAN4-S105 for ratings specified or indicated.

.2 Install labelled, fire resistance rated, steel doors and frames in accordance with NFPA-80 except where specified otherwise.

1.5 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 30 00.

.2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, glazed and louvred openings, arrangement of hardware and fire ratings.

.3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and finishes.

2 PRODUCTS

2.1 MATERIALS

.1 Steel Sheet: Cold-rolled, commercial grade steel sheet, Type A, to ASTM A1008/A1008M 1.519mm base metal thickness;

.1 Hot-dip Galvanized/Galvannealed: zinc-coated to ASTM A653/A653M, coating designation Z275, for all exterior doors and frames, and all doors and frames in Shower/Change Rooms.

.2 Wipe-Coat Galvanized: to ASTM A653/A653M, coating designation ZF001, for all other doors and frames.

.2 Insulation

.1 Polyisocyanurate: to CAN/ULC-S704, Type 1, Class 1 closed-cell polyisocyanurate foam manufactured using HCFC-free blowing agents, and as follows;

.1 Compressive strength: 140kPa minimum.

.2 Flame Spread: 500 to CAN/ULC-S102.

.3 Vapour Permeance: 1.5ng/Pa s m^2 maximum.

.4 Dimensional stability: 1.5% maximum linear change at 70°C and 97% relative humidity for 7 days.

.5 Curing Time: minimum 24 hours, plus 24 hours per 25mm of thickness before shipment from manufacturer.

.6 Long Term Thermal Resistance (LTTR)

.1 RSI 1.04 for 25mm board thickness.

.2 RSI 2.09 for 50mm board thickness.

.3 RSI 3.18 for 75mm board thickness.

.2 Semi-Rigid Mineral Fibre: processed from rock, slag, or glass, to CAN/ULC-S702 Type 1, minimum density 24 kg/m^3;

.3 Primer: Zinc-rich rust inhibitive type to CAN/CGSB-1.181.

2.2 ACCESSORIES

.1 Door Bumpers: Single stud rubber/neoprene type.

.2 Exterior Top Caps: Rigid PVC extrusion conforming to CGSB 41-GP-19Ma.

2.3 FABRICATION

.1 General

.1 Fabricate doors and frames as detailed, to CSDFMA Specifications for Commercial Steel Doors and Frames, except where specified otherwise.

.2 Blank, reinforce, drill and tap doors and frames for all hardware. Mortised cutouts shall be protected with steel guard boxes.

.3 Reinforce doors and frames for surface mounted hardware.

.4 Formed edges shall be true and straight with a minimum radius for the thickness of steel used.

.5 Provide for appropriate anchorage to floor and wall construction. Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb.

.6 For rebate opening heights up to and including 1525mm, provide two anchors, and an additional anchor for each additional 760mm or fraction thereof.

.7 Frames in existing concrete, masonry or steel shall be provided with anchors located not more than 152mm from top and bottom of each jamb, and intermediate anchors at 660mm o.c. max.

.8 All screw anchors for frames shall be Robertson flat head type and fully countersunk.

.9 Each door opening shall be prepared for rubber stud door silencers, three (3) for single doors, two (2) for double doors.

.10 Factory-apply touch up primer to galvanized steel doors and frames where coating has been removed during fabrication.

.11 Fire labelled doors and frames shall be provided for those openings requiring fire protection ratings. Doors and frames shall be tested in accordance with CAN4-S104.

.12 Provide all required internal steel frame reinforcement to ensure structural rigidity and integrity, including connections to nearest building structure elements.

.13 Door faces of all steel doors shall be fabricated without visible seams, free of scale, pitting, coil brakes, buckles and waves.

.14 Construct stile and rail doors in same manner as flush doors.

.15 Construct matching transom panels or inactive leaves in same manner as doors.

.16 Longitudinal edges of interior doors shall be mechanically interlocked, adhesive assisted with edge seams tack welded, filled and sanded flush with no visible seam.

.17 Lock and hinge edges shall be beveled 3mm in 50mm unless hardware or door swing dictates otherwise.

.18 Top and bottom of doors shall be provided with inverted, recessed, 1.519mm steel end channels, welded to each face sheet at 152mm on center maximum.

.19 Exterior doors shall be provided with factory installed flush PVC top caps. Fire labeled exterior doors shall be provided with factory-installed flush steel top caps.

.20 Provide 1.519mm closer reinforcement channels at top of all doors (interior and exterior).

.21 Fire labelled doors shall be provided for those openings requiring fire protection ratings, as indicated. Such frames shall be tested in conformance with CAN4-S104.

.2 Doors

.1 Exterior Doors

.1 Face Sheets: 1.519mm base metal thickness.

.2 Door Cores

.1 Bonded (Insulated) Core: Polyisocyanurate insulation as specified above, in slab form, thermally bonded to door skins.

.2 Hardware Preparation

.1 Doors shall be factory blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templates provided by the hardware supplier.

.2 Doors shall be factory blanked and reinforced only for mortised hardware that is not fully templated.

.3 Doors shall be factory reinforced only for surface mounted hardware.

.4 Templated holes 13mm diameter and larger shall be factory prepared, except mounting and through bolt holes, which shall be by the contractor responsible for installation on site, at the time of application. Templated holes less than 13mm diameter shall be factory prepared only when required for the function of the device (for knobs, levers, cylinders, thumb or turn pieces) or when these holes over-lap function holes.

.5 Drilling and tapping for surface mounted hardware or mortised hardware that is not fully templated shall be by the contractor responsible for installation on site, at the time of application.

.6 Hinge and pivot reinforcements shall be 3.416 mm steel minimum high frequency type reinforcing.

.7 Doors in excess of 2450mm rabbet height shall be prepared for 114.3mm heavy weight 4.6mm hinges minimum.

.8 Lock, strike and flush bolt reinforcements shall be 1.519mm steel minimum.

.9 Reinforcements for concealed closers and holders shall be 2.657mm steel minimum.

.10 For surface mounted hardware, reinforcements shall be 1.519mm steel minimum.

.11 Where electrically or electronically operated hardware is specified on the schedules or details or the final approved schedule and templates provided by the hardware supplier, hardware enclosures and/or junction boxes, where indicated on the templates, shall be provided and inter-connected with CSA-approved 13mm diameter conduit and connectors.

.3 Glazing

.1 Make provision for glazing as indicated and provide necessary glazing stops in accordance with tested and labelled assemblies.

.2 All glazing rebates and stops for frames located in fire separations shall be minimum 20mm in height.

.3 Where glazing materials up to and including 8mm thick are specified, doors shall be provided with 0.912mm steel glazing trim and snap-in glazing stops.

.4 Where glazing materials greater than 8mm thick are specified, doors shall receive 0.912mm steel trim and screw-fixed glazing stops. Screws shall be #6 x 31mm flat head, countersunk self-drilling type at 300mm on center maximum.

.5 Glazing trim and stops shall be accurately fitted, butted at corners, with removable glazing stops located on the 'push' side of the door.

.4 Finishing

.1 Remove weld slag and splatter from exposed surfaces.

.2 All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth uniform surfaces.

.3 On exposed surfaces where zinc coating has been removed during fabrication, doors shall receive a factory applied touch-up primer.

.4 Primer shall be fully cured prior to shipment.

.3 Frames

.1 General

.1 Fabricate frames from tension leveled steel to ASTM A924, galvanized to ASTM A653/653M, Commercial Steel (CS), Type B.

.2 Exterior Frames
- .1 Fabricate from 1.519mm base metal thickness.
- .2 Exterior frame product shall be supplied set-up and welded.

.3 Corner joints shall be accurately mitered and tightly fitted with integral door stops mitered or butted when assembled.

.4 Corner joints shall be welded on the inside of the profiles' returns and faces for set-up and welded frames.

.5 Joints at mullions, transom bars, sills or center rails shall be coped accurately, butted and tightly fitted, with faces securely welded, matching corner joint faces.

.6 All transom frames must be mechanically fastened to jambs, or welded connections. Clips will be not be permitted. Transom connections must be able to support attached equipment such as power door operators.

.7 Frame product shall be fabricated with integral door stops having a minimum height of 16mm.

.8 Glazing stops shall be square, formed 0.912mm steel, 16mm minimum bevelled height channel, accurately fitted, butted at corners and fastened to frame sections with #6 x 31mm flat head countersunk scrulox (self-drilling) type screws at 300mm on center maximum. Stops shall be 20mm high at all labelled frames.

.9 Locate glazing stops on room side of screens, not exterior side.

.10 Where required due to site access, as indicated on schedules, when advised by the contractor responsible for co-ordination or installation, or when shipping limitations so dictate, frame shall be fabricated in sections for splicing in the field.

.11 Field spliced jambs, heads and sills shall be provided with 1.519mm steel splice plates securely welded into one section, extending 100mm minimum each side of splice joint.

.12 Field splices at closed sections (mullions or center rails) shall be 1.519mm steel splice angles securely welded to the abutting member. Face of splice angle shall extend 100mm minimum into closed sections when assembled.

.13 Field splice joints shall be welded, filled and ground to present a smooth uniform surface.

.14 On factory-assembled frame product, each door opening shall be provided with two (2) temporary steel jamb spreaders welded to the base of the jambs or mullions to maintain proper alignment during shipping and handling. Spreaders shall be removed prior to anchoring of frame to floor.

.15 Each door opening shall be prepared for single stud door silencers, three (3) for single door openings, two (2) for double door openings. Silencers shall be shipped loose for installation after finish painting.

.16 Hardware Preparation

.1 Frame product shall be blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templates provided by the hardware supplier.

.2 Frame product shall be factory blanked and reinforced only for mortised hardware that is not fully templated.

.3 Frame product shall be reinforced only for surface mounted hardware.

.4 Drilling and tapping for surface mounted hardware or mortised hardware not templated shall be done at the time of installation.

.5 Frames shall be prepared for 114mm standard weight hinges (minimum).

.6 Hinge and pivot reinforcements shall be 3.416mm steel minimum reinforcing, high frequency type shall be provided.

.7 Strike reinforcements shall be 1.519mm steel minimum.

.8 Reinforcements for surface mounted hardware, concealed closers and holders and flush bolts shall be 2.657mm steel minimum.

.9 Mortised cutouts shall be protected with 0.759mm steel minimum guard boxes.

.10 Where electrically or electronically operated hardware is specified on schedules or details, or the final approved schedule and templates provided by the hardware supplier, hardware enclosures and/or junction boxes where indicated on templates shall be provided and inter-connected with CSA-approved 13mm diameter conduit and connectors.

.17 Anchorage

.1 Frame product shall be provided with anchorage appropriate to floor, wall and frame construction.

.2 Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb, except as indicated below.

.3 Frame product installed in unit masonry partitions shall be provided with 4.0mm diameter steel wire anchors, 1.214mm steel adjustable stirrup and strap or "T" type anchors as conditions dictate.

.4 Where frame product is installed prior to construction of the adjacent wall, each jamb shall be provided with 1.519mm steel floor anchors. Each anchor shall be provided with two (2) holes for mounting to the floor and shall be securely welded to the inside of the jamb profile designed so as not to permit thermal transfers from exterior to interior surfaces of the frame sections.

.5 All visible frame anchor screws shall be Robertson flat head countersunk type.

.6 Frame product installed in steel stud and drywall partitions shall be provided with 0.912mm steel snap-in or "Z" type stud type anchors.

.7 Jambs of frames in previously placed concrete, masonry or structural steel shall be punched and dimpled to accept machine bolt anchors, 6.4mm diameter, located not more than 152mm from the top and bottom of each jamb. Anchor preparations and guides shall also be located immediately above or below the intermediate hinge reinforcings and directly opposite on the strike jamb. Each preparation shall be provided with 1.519mm anchor bolt guides.

.8 After sufficient tightening of the anchor bolt, the head shall be welded so as to provide a non-removable application. Welded bolt and dimple shall be filled and ground to present a smooth uniform surface, prior to finish painting.

.9 Where indicated on schedules or details, channel extensions shall be provided from the top of the frame assembly to the underside of the structure above. Extensions shall be fabricated from 2.657mm steel formed channels, mounting angles and adjusting brackets, with mounting angles welded to the inside of frame head. Formed channels, adjusting brackets and fasteners shall be shipped loose. Channels shall be mechanically connected to mounting angles and adjusting brackets with supplied fasteners on site.

.10 For fire labeled frames, each strike jamb shall be provided with an additional snap-in anchor in each face, to be installed above or below the strike reinforcement. Each head for fire labeled pairs shall be provided with two (2) snap-in anchors, to be installed in the head faces at the center of the rabbet opening width.

.18 Finishing

.1 Remove weld slag and spatter from exposed surfaces.

.2 All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth and uniform surfaces.

.3 On exposed surfaces where zinc has been removed during fabrication, frame product shall receive a factory applied touch-up primer.

2.4 SIZES AND TOLERANCES

.1 Widths of door openings shall be measured from inside of frame jamb rabbet with a tolerance of +1.6mm - 0.8mm.

.2 Heights of door openings shall be measured from the finished floor (exclusive of floor coverings) to the head rabbet of the frame with a tolerance of ± 1.2mm.

.3 Unless builders' hardware dictates otherwise, doors shall be sized so as to fit the above openings and allow a 3mm clearance at jambs and head. A clearance of 19mm between the bottom of the door and the finished floor (exclusive of floor coverings) shall be provided. Tolerances on door sizes shall be ± 1.2mm.

.4 Manufacturing tolerances on formed frame profiles shall be ± 0.8mm for faces, door stop heights and jamb depths. Tolerances for throat openings and door rabbets shall be ± 1.6mm and ± 0.4mm respectively. Hardware cutout dimensions shall be as per template dimensions, +0.4mm, - 0.

2.5 HARDWARE LOCATIONS

.1 Hardware preparations in frame product shall be as noted below and locations on doors shall be adjusted for clearances specified above.

.2 Top of upper hinge preparation for 114.3mm hinges shall be located 180mm down from head, transom mullion or panel as appropriate. The top of the bottom hinge preparation for 114.3mm hinges shall be located 310mm from finished floor as defined above. Intermediate hinge preparations shall be spaced equally between top and bottom cutouts. For dutch door frames, top and bottom hinge locations shall be as above, with the tops of intermediate hinges located at 930mm and 1403mm from finished floor.

.3 Strike preparations for unit, integral, cylindrical and mortise locks and roller latches shall be centered 1033mm from finished floor. Strikes for deadlocks shall be centered at 1220mm from finished floor. Strikes for panic or fire exit hardware shall be located as per device manufacturer's templates.

.4 Push and/or pulls on doors shall be centered 1070mm from finished floor.

.5 Preparations not noted above shall be as per hardware manufacturer's templates.

.6 Hardware preparation tolerances shall comply with ANSI A156 Series standards.

3 EXECUTION

3.1 INSTALLATION

.1 General

.1 Install all doors and frames in accordance with NFPA-80.

.2 Doors

.1 Install doors in accordance with manufacturer's instructions and templates.

.2 Install hardware in accordance with hardware templates, manufacturer's instructions and Section 08 71 00.

.3 Provide maximum clearances at edges of doors as follows:

.1 Between door and frame at head and jambs: 3mm.
.2 At meeting edges pairs of doors and at mullions: 3mm.
.3 At transom panels, without transom bars: 3mm.
.4 At sills without thresholds: 16mm maximum above finish floor.
.5 At sills with thresholds: 3mm above threshold.

.4 Adjust operable parts for correct function.

.5 Install louvres securely in doors.

.3 Frames

.1 Set frames plumb, square, level and at correct elevation.

.2 Secure anchorages and connections to adjacent construction.

.3 Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support at centre of head for openings over 1220mm wide. Remove temporary spreaders after frames are built-in.

.4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.

.5 Install all frame reinforcing where indicated or required for structural rigidity.

3.2 FINISH REPAIRS

.1 Touch up with primer galvanized finish damaged during installation.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to supply finish hardware, including the following:

.1 Supply and delivery to the project all items of architectural finishing hardware specified herein,

.2 Supply and installation of low-energy door operators and hardware,

.3 Supply and installation of all electrical hardware items including, but not limited to; low voltage wire (FT6 plenum-rated when not in conduit), maglocks, electric strikes, electric exit devices, current transfer devices, wall switches, jamb switches, keypads, controllers, power supplies, and

.4 Completion of all low voltage terminations by the hardware supplier.

1.3 REFERENCE STANDARDS

.1 Canadian Metric Guide for Steel Doors and Frames; Canadian Steel Door and Frame Manufacturers' Association.

.2 ANSI/DHI A115.1G-94; Installation Guide for Doors and Hardware.

.3 CAN/CGSB 69.18-M90/ANSI/BHMA-A156.1; Butts & Hinges.

.4 ANSI/BHMA-A156.2-1996; Bored & Preassembled Locks & Latches.

.5 CAN/CGSB CAN/CGSSB-69.19-93/ ANSI/BHMA-A156.3; Exit Devices.

.6 CAN/CGSB 69.20-M90/ANSI/BHMA-A156.4; Door Controls – Closers.

.7 CAN/CGSB 69.21-M90/ANSI/BHMA-A156.5; Auxiliary Locks.

.8 CAN/CGSB 69.22-M90/ ANSI/BHMA-A156.6; Architectural Door Trim.

.9 CAN/CGSB 69.23-M90/ ANSI/BHMA-A156.7; Hinge Templates.

.10 CAN/CGSB 69.26-96/ ANSI/BHMA-A156.10; Power Operated Pedestrian Doors.

.11 CAN/CGSB 69.29-93/ ANSI/BHMA-A156.13; Mortise Locks & Latches.

.12 CAN/CGSB 69.31-M89/ ANSI/BHMA-A156.15; Closer Holder Release Devices.

.13 CAN/CGSB 69.34-93/ ANSI/BHMA-A156.18; Materials & Finishes.

.14 CAN/CGSB 69.35-M89/ ANSI/BHMA-A156.19; Power Assist and Low-Energy Power-Operated Doors.

.15 CAN/CGSB 69.36-M90/ ANSI/BHMA-A156.20; Strap & Tee Hinges and Hasps.

.16 CAN/CGSB 69.37-93/ ANSI/BHMA-A156.21; Thresholds.

.17 ANSI/BHMA-A156.22; Gasketing and Edge Seal Systems.

.18 ANSI/BHMA-A156.23; Electromagnetic Locks.

.19 ANSI/BHMA-A156.28; Keying Systems.

.20 ANSI/BHMA-A156.29; Exit Lock and Alarms.
.21 ANSI/BHMA-A156.30; Mortise Locks.
.22 ANSI/BHMA-A156.31; Electric Strikes.

1.4 DEFINITIONS

.1 Architectural Hardware Consultant (AHC): person or persons skilled in selecting, coordinating and specifying architectural hardware, and certified by the Door and Hardware Institute.

.2 Hardware Supplier: company or group of companies whose purpose is the manufacture and supply of architectural finish hardware.

.3 Hardware Distributor: company whose purpose is the distribution of architectural finish hardware.

1.5 QUALITY ASSURANCE

.1 Products

.1 Products specified herein are minimum standard. Approved substitutions are listed.

.2 Hardware for doors in fire separations and exit doors must be certified by a Canadian Certification Organization accredited by Standards Council of Canada. Supply only ULC and/or CSA listed electrical components.

.2 Hardware Suppliers

.1 Hardware Suppliers must have in their employ a certified Architectural Hardware Consultant (AHC) certified by the Door and Hardware Institute.

.2 The Hardware Supplier will provide following services to the Contract:

.1 preparation of the hardware schedule issued for tender,
.2 review of all shop drawings,
.3 provision of requested samples,
.4 review of hardware substitution submittals, and
.5 provision of all inspections and reports as specified herein.

.3 Hardware Distributors

.1 The Distributor must have a minimum of five (5) years documented experience in the supply of Finish Hardware for similar projects.

.2 Hardware Distributors must have in their employ a certified Architectural Hardware Consultant (AHC) certified by the Door and Hardware Institute.

.3 The Hardware Distributor will assume responsibility that the Products supplied under this section meet or exceed the minimum requirements of the specifications, the hardware schedule, and all authorities having jurisdiction.

.4 Hardware Distributors must be approved by the Consultant prior to submitting a bid, and must extend all applicable manufacturers' warranties to the Contract.

.4 Installers

.1 Hardware Installers must have a minimum of five (5) years experience in installation of hardware. The Contractor shall provide verification of installer's

qualification to the Consultant for approval. Installers to attend all review meetings with the Hardware Supplier and Distributor.

.5 Pre-installation Meeting
.1 Convene a pre-installation meeting for the work specified in this section. Attendees must include, as a minimum, representatives of the following:
.1 Contractor (Site Superintendent & Project Manager)
.2 Installation Subcontractor (Site Foreman & Project Manager)
.3 Hardware Supplier (AHC)
.4 Hardware Distributor (AHC and Installer)
.5 Related Subcontractors (ie. Electrical, Security Systems)

1.6 SUBMITTALS
.1 Updated Finish Hardware Schedule
.1 Prepare and submit six (6) complete detailed hardware schedules prepared in 216mmx279mm DHI format.

.2 Product Data
.1 Provide in a three ring binder six (6) copies of product data sheets with the finish hardware schedule showing all items of hardware to be used on the project.

.3 Samples
.1 When requested in writing, provide one sample of each hardware item requested complete with fasteners to the office of the Consultant. Samples to be clearly labeled with their hardware schedule designation and manufacturers' name and model number. Samples may be incorporated into the Work.

.4 Templates
.1 Provide other sections with two (2) complete sets of hardware templates for related fabricating and installation.

.5 Keying Schedule
.1 Provide three (3) copies of keying schedule for review. Include all special keying notes and stamping instructions. Locks and cylinders are not to be ordered until the key schedule has been approved by the Owner.

.6 Wiring Diagrams
.1 Provide a written description of the functional use of all electrical hardware. Include door and frame elevations showing the location of each item of electrical hardware to be installed, including a diagram showing number and size of all conductors. Include drawings showing all terminal connections. Where electrical hardware is to be supplied and installed provide the Contractor with riser diagrams listing the correct wire runs and back box sizes as well as 115V AC requirements.

.7 Operations and Maintenance Data
.1 Prior to Substantial Performance, provide two (2) copies of the following information for inclusion in Operation And Maintenance Manuals in accordance with Section 01 78 00:
.1 Maintenance instructions for each hardware item,
.2 Catalogue cut sheets and Product Specifications or each product,
.3 Parts list for each product,
.4 Copy of final "as-built" finish hardware schedule, and

.5 Copy of final keying schedule.

.8 Maintenance Materials

.1 Provide the following maintenance materials in accordance with Section 01 78 00:

.1 Five (5) of each installation tool used for locks/passage/privacy, all type of door closers, and all exit devices.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Deliver each hardware item in its original package complete with all fasteners, keys, templates, and installation instructions required for installation.

.2 Package hardware separately for each door or unit and state clearly on each package the number and description of the door or unit for which the hardware therein is intended. Group items accordingly.

.3 Clearly mark each container with the door opening number and the hardware schedule item or heading number.

.4 Store hardware in a locked room or other secure area, accessible by only the Contractor. Storage area must contain adequate storage provision to hold all hardware off the floor (temporary shelving or wood pallets). Ensure area is kept dry and clean.

.5 When requested, package items of hardware separately for delivery to other fabricators for their installation.

.6 Deliver and assist in unloading and sorting of hardware. All hardware must be checked in on site by the Contractor's Site Supervisor.

1.8 COORDINATION WITH OTHER TRADES

.1 Supply finish hardware to those who are to install it, complete with templates and other complete installation instructions in sufficient time to avoid delaying the progress of the work.

.2 Supply complete templates and instructions to all door and frame manufacturers for factory machining of products to receive Hardware.

1.9 INSPECTION

.1 Hardware Distributor must perform the following inspections:

.1 Check all hardware when it has been installed and notify the Consultant of improper installation, defective materials, or products installed that were not specified. Replace defective hardware promptly.

.2 Check all door closers after they have been installed to make sure that all adjustments such as back-checking degree have been properly made. Notify the Consultant of any closers which have not been properly adjusted.

1.10 MAINTENANCE

Maintenance Service

Following occupancy of the building by the Owner, arrange with the Owner's maintenance staff for instruction of proper use, servicing, adjusting and lubrication of all finish hardware. Submit to the Consultant a list of attendees and meeting date.

1.11 EXTENDED WARRANTIES

.1 Provide the following manufacturer's warranties beyond the date of expiration of the Contract warranty:

.1	Mortise Hinges	Lifetime
.2	Pivot Sets	2 yrs.
.3	Locks	7 yrs.
.4	Keypad Locks	1 yr.
.5	Exit Devices	3 yrs.
.6	Door closers -mechanical	10 yrs.
.7	Door Hold open Devices - Electro mechanical	2 yrs.
.8	Overhead stops/holders	1 yr.
.9	Floor/Wall stops	1 yr.
.10	Electric Strikes/Key Switches/Power Supplies	1 yr.
.11	Electromagnetic Locks	Lifetime
.12	All other hardware items	1 yr.

2 PRODUCTS

2.1 MATERIALS

.1 Fabricate all hardware to template. Provide templates and template hardware together with the instructions necessary for door and frame preparation.

.2 Supply all hardware with necessary screws, bolts or other fastening devices to anchor hardware in position neatly and properly in accordance with best practices.

.3 Only products listed in the hardware schedule or the approved alternates noted in the following list are to be used on this project.

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

.5 All exterior doors shall be fitted with complete perimeter weatherstripping and threshold where not provided by door or frame manufacturer.

.6 All exterior aluminum doors shall be fitted with recessed retractable, bottom sweeps.

.7 No substitutions are allowed for the following products, due to integration with existing hardware:

.1 Locksets, Latchsets, and Privacy Sets.
.2 Panic Sets
.3 Door Closers.

2.2 FASTENINGS

.1 Supply all required bolts, screws, expansion shields, anchors, and other related accessories for satisfactory attaching or installing of all finish hardware.

.2 Exposed fasteners shall match finish of, and be of compatible material with hardware.

.3 Where push/pull hardware is scheduled, door pull must be through-fastened and have fasteners concealed by push plate on opposite side.

2.3 HINGES

.1 Butt Hinges: ANSI/BHMA-A156.1, Grade 1.

.1 Supply hinges with non-removable pin (NRP) option on all doors where the hinge barrel is exposed on the securedexterior side of the door.

.2 Use two hinges on doors up to (5'-0")1525mm and an additional hinge for each additional 760mm or fraction thereof.

.3 Doors 900mm wide and less; 114mm high hinges; doors greater than 914mm wide; 127mm high hinges, all heavystandard weight.

.4 Provide Model FBB199-32D for all exterior applications; Model FBB168-26D for heavy use and oversized doors; Model FBB179-26D for all other interior doors as indicated in the Hardware Schedule.

2.4 LOCKSETS, LATCHSETS, DEADLOCKS

.1 Grade 2 Cylindrical-Lever

.1 ANSI/BHMA-A156.2, Grade 2 standard duty commercial exterior and interior cUL listed for all functions up to 3-hour doors. Levers to be solid pressure cast zinc with no plastic inserts. Precision solid brass 6-pin cylinder with nickel silver keys. Grade 2 lever sets to have through bolts to prevent chassis rotation with internal components and chassis constructed of cold rolled steel with zinc dichromate plating to resist corrosion. Lever sets to have independent heavy duty compression springs as well as precision laser cut stainless steel spindles with interlocking on keyed side.

.1 Model Marks 75 Series with #2 Lever and E7 Latch option.

.2 Grade 1 Deadbolt

.1 ANSI/BHMA-A156.5, Grade 1 deadbolt supplied with solid brass or bronze trim rings and 25mm throw high-strength, steel alloy deadbolt with hardened steel roller resistant to sawing and kick-in attacks. Metal shield protects bolt from attack through the door as well as hardened steel balls that protect mounting screws from drill attack. Exclusive wood frame reinforcer protects wood jamb against kick-in attacks.

.1 Model Medeco Maximum with keyway to suit.

2.5 DOOR CLOSERS

.1 Door closers to be Grade 1 ANSI/BMHA A156, and have the following features (see separate closer sections below for further information):

.1 fully hydraulic, rack and pinion action with high strength cast iron cylinders and one piece forged steel pistons.

.2 hydraulic fluid of a type requires no seasonal adjustments, and has constant temperature control from 49°C to –35°C.

.3 hydraulic regulation controlled by tamper-proof, non-critical screw valves, adjustable with a hex wrench.

.4 separate adjustments for backcheck, general speed and latch speed.

.5 include high efficiency, low friction pinion bearings.

.6 size 1 manual door closers to provide less than 22N opening force on a 914mm door leaf.

.7 closers with painted finishes shall exceed a minimum 100-hour salt spray test, as described in ANSI/BHMA-A156 and ASTM B117.

.8 closers detailed with plated finishes shall include plated covers (or finish plates) , arms and visible fasteners.

.9 provided with all mounting plates required to mount on any special door and frame conditions.

.10 LCN Models 4010, 4020, 4110 ONLY – NO SUBSTITUTION (all closers must be handed type; universal tri-pack not acceptable).

2.6 DOOR OPERATORS

.1 Heavy Duty Electric Operator (Push Side Mount)

.1 ANSI/BHMA-A156.19, non-sized (2-5) and non-handed cylinder body to have 38mm piston diameter with 17.5mm double heat-treated shaft. With forged steel main arm. Power operator to include:

.1 Provisions for separate conduits to carry high and low voltage wiring in compliance with the National Electrical code.

.2 Second Chance Function: program within the on-board computer monitoring resistance during opening cycle. If resistance is present operator pauses for a few seconds, then attempts to open door again. If resistance does not exist door will open normally. However if resistance still exists, door will pause and the unit will time out and door will close.

.3 Breakaway Drive System: System within the motor/clutch assembly. If the door is forced closed while in the opening cycle, the clutch slips preventing damage to the operator, door and frame.

.4 Soft Start Motor Control: required for controlled start once actuator is depressed to extend the service life of all drives components.

.5 Built in Power Supply to deliver 12V and 24V outputs up to a maximum of 1.0 amp.

.6 Certified by cUL for use on labeled doors.

.7 Independent adjustments for all electrically controlled functions within controller module.

.8 Model Nabco GT710.

.2 Actuators

.1 Wall Type

.1 Wall plate switch must be hard-wired either 12V DC or 24V DC actuator with round, stainless steel touch plate in either 114mm or 152mm diameters. Engraved blue filled handicap symbol conforms to most accessibility codes. Units to include heavy grade components for vandal resistant mounting and weather resistant switch standard.

.1 Model CM7536 (full length)

.3 Low energy door operators will be supplied and installed by factory trained installers. Hardware supplier will coordinate the installation of the door operators and include the cost of labour for this work.

2.7 OVERHEAD DOOR STOPS/HOLDERS

.1 Heavy Duty Surface Mounted

.1 ANSI/BHMA-A156.8, Grade 1. Surface overhead stops/holders shall be non-handed for single-acting doors with a heavy-duty channel/slide-arm design and offset jamb bracket to allow for simple field modifications of functions. Channel to be surface mounted to the door with thru bolts and the jamb bracket is surface mounted to the jamb.

.1 Model GJ90 Series.

.2 Heavy Duty Concealed Mounting

.1 ANSI/BHMA-A156.8, Grade 1. Concealed overhead stops/holders shall be non-handed for single or double-acting doors with a low profile channel, constructed of heavy guage brass material, is mortised in the door and jamb bracket is

mortised in the doorframe. This allows for the unit to be fully concealed when door is in the closed position. Units to be field adjustable for function changes if required.

.1 Model GJ100 Series.

2.8 PULLS AND PLATES

.1 Supply door trim as listed in hardware schedule. Supply pulls with back to back (BTB) or through bolt mounting as required. When push plates are listed with door pulls, install the push plate to conceal the through bolt.

.2 All kickplates, push plates, and bumper plates must have all sides beveled and corners rounded to ensure no sharp edges. Supply plates with countersunk screw holes.

.3 Kick plates will be minimum 0.050mm thick unless listed otherwise; size to be door width less 35mm for single door, and less 25mm for pairs of doors. Heights as scheduled.

2.9 DOOR STOPS AND HOLDERS

.1 Floor Stops (Doors without Threshold)

.1 ANSI/BHMA-A156.6. Floor stops to be 25mm overall height with 4.8mm base height for use on doors without thresholds. Heavy-duty cast dome stop constructed of brass/bronze with gray, non-marring rubber bumper.

.2 Floor Stops (Doors with threshold or undercut doors)

.1 ANSI/BHMA-A156.6. Floor stops to be 25mm overall height with 14.3mm base height for use on doors with thresholds or undercut doors. Heavy-duty cast dome stop constructed of brass/bronze with gray, non-marring rubber bumper.

.3 Wall Stops (No Button on Locking Hardware)

.1 ANSI/BHMA-A156.6. Wall stops to be constructed of heavy-duty brass base with special retainer cup that makes the rubber stop tamper resistant. Convex design of rubber bumper.

.4 Wall Stops (Projecting Button on Locking Hardware)

.1 ANSI/BHMA-A156.6. Wall stops to be constructed of heavy-duty brass base with special retainer cup that makes the rubber stop tamper resistant. Concave rubber bumper to avoid damage to locks with projecting buttons.

.5 Supply wall stops where wall conditions are sufficient to support impact loads, such as stud partitions with wood blocking, masonry, or concrete. Supply floor stops with sufficient height to suite the floor condition or undercut of doors.

.6 Overhead stops and mechanical holders shall be surface mounted unless a conflict exists with door closers or other hardware. Provide door stays with friction action in locations that do not have door closers. Install all overhead stops and holders for 90° stop unless otherwise specified.

.7 Electronic door holders will be supplied tri-voltage and be connected to the fire alarm system by Division 16 to release the door when signaled.

2.10 DOOR SEALS

.1 Supply perimeter seals to fully cover all gaps between door, frame, and floor condition to seal against weather, sound, or smoke as required and scheduled.

.2 Frame gaskets shall be closed cell neoprene. Extruded housing must have a rib to prevent distortion during installation. Aluminum frames will be provided with weather stripping inserts by the frame supplier.

.3 Door bottoms will be heavy-duty and have an adjustment screw to ensure proper contact with flooring. Supply correct drop insert for carpet where required.

2.11 THRESHOLDS

.1 Supply extruded aluminum thresholds to ensure the sweep or door bottom makes full contact. Supply thermally broken thresholds for all exterior door openings.

.2 Threshold height shall not exceed 13mm for barrier-free path of travel.

2.12 ELECTRONIC HARDWARE

.1 Electric Strikes

.1 ANSI/BHMA-A156.31, Grade 1. Electric strikes to be cUL listed burglary-resistant and electric strike for fire doors and frames; "A" label for single doors and "B" label for double doors. Electric strikes to be stainless steel construction, non-handed available in 12V or 24V AC or DC with continuous duty solenoid and accept 19mm throw latchbolts. Strike box to be adjustable to compensate for any misalignment of the door or frame with two piece plug connector for ease of installation.

.2 Power Supplies

.1 Power supplies to be Underwriter Laboratories (UL) listed for general-purpose use tested to meet UL1012 specifications. Power supplies to have 12/24V DC field selectable output voltage with output current of 3 amps at 12V DC and 2 amps at 24V DC with supply output voltage filtered and regulated. The power supply to be inherently modular by design for ease of installation and to provide flexibility for future system modifications when necessary.

.3 Include power supplies that are compatible with magnetic lock and have a NFPA-101 fire alarm release. Reset key switch will be centrally located and will re-arm all the magnetic locks in the building.

.4 Electronic hardware will be supplied and installed by this section, including all low voltage device wiring.

2.13 FINISHES

.1 Finishes are specified as follows:

Item	BHMA#	Finish Description	Base Material(s)
Hinges	630	satin stainless steel	stainless steel
Hinges	626	satin chrome plated	brass/bronze
Hinges	652	satin chrome plated	steel
Pivots	689	powder coat aluminum	steel
Lock Trim	626	satin chrome plated	brass/bronze
Exit Devices	626	satin chrome plated	brass/bronze
Dr Closer	689	powder coat aluminum	steel
Dr Pulls	630	satin stainless steel	stainless steel
Protective Plate	630	satin stainless steel	stainless steel
Door Stops/Holders			
Overhead	630	satin stainless steel	stainless steel

Wall/Floor	626	satin chrome plated	brass/bronze
Thresholds	628	anodized aluminum	aluminum
Weatherstrip	628	anodized aluminum	aluminum
Miscellaneous			
Coat hooks	626	satin chrome plated	brass/bronze
Mullions	628	anodized aluminum	steel
Key Switches	630	satin stainless steel	stainless steel
Electric Strikes	630	satin stainless steel	stainless steel
Magnetic Locks	628	anodized aluminum	steel

2.14 KEYING

.1 General

.1 Architectural Hardware Consultant (AHC) will meet with the Owner to obtain and finalize all keying requirements, and will subsequently issue copies of the keying schedule for review.

.2 Key Material: Provide manufacturer's standard embossed keys of nickel silver to ensure durability.

.3 Key Quantity: Furnish keys in the following quantities:

.1 Master keys per master group: 4 each.

.2 Change keys per cylinder or keyed alike group: 4 each.

.4 Deliver all permanent key blanks and security keys direct to Owner from factory by secure courier, return receipt requested. Failure to properly comply with these requirements may be cause to require replacement of all or any part of the cylinders and keys involved as deemed necessary at no additional cost to the Owner.

.5 If required by the Owner, furnish one key control system complete with indexed door numbers, key codes, bittings, building numbers, room numbers, lock function, design, and finish. In addition, include model numbers, handing, design, and functions of exit devices and door closers. Transmit to the Owner by secure carrier, return receipt requested.

.6 Provide complete cross-index system, place keys on markers and hooks in the cabinet as determined by the finial key schedule. Provide one each key cabinet and hinged panel type cabinet for wall mounting as noted in detailed hardware schedule.

.2 Standard Keying With High-Security Cylinders

.1 Permanent keying will be Medeco as rqeuired by the Owner.

3 EXECUTION

3.1 EXAMINATION

.1 Ensure that doors and frames are properly prepared and reinforced to receive finish hardware prior to installation.

.2 Ensure that door frames and finished floor are sufficiently plumb and level to permit proper engagement and operation of hardware.

.3 Submit to Consultant in writing a list of deficiencies determined as part of inspection required in 3.3.1 and 3.3.2, prior to installation of finished hardware.

3.2 INSTALLATION

.1 Install hardware to ANSI/DHI-A115.1G.

.2 Install hardware at mounting heights as specified in the manufacturers templates or specific references in approved hardware schedule or approved elevation drawings. Where mounting height is not otherwise specified herein, install hardware at the following mounting heights:

.1 Locksets: 1015mm.
.2 Exit device: 1015mm.
.3 Push/Pull: 1065mm.
.4 Deadlock: 1200mm.

.3 Install hardware using only manufacturer supplied and approved fasteners in strict adherence with manufacturers published installation instructions.

.4 Ensure that all locksets / latchsets / deadlocks are of the correct hand before installation to ensure that the cylinder is in the correct position. Handing is part of installation procedure.

.5 Follow all manufactures installation instructions. Adjustment is inclusive of spring power, closing speed, latching speed and back-check at the time of installation.

.6 Install head seal prior to installation of parallel arm mounted door closers and push side mounted door stops/holders.

.7 Counter sink through bolt of door pull under push plate during installation.

.8 Mount all closers, automatic operators and hold-open devices with through bolts, as indicated in the finish hardware schedule.

.9 Where door stop contacts door pulls, mount stop to strike bottom of pull.

.10 Remove construction locks when directed by Consultant; install permanent cores and check operation of all locks.

.11 Other trades installing hardware must follow all manufacturers instructions including door closer adjustment, handing of locksets as required, and degree of door swing.

.12 Hardware Distributor will include all labour to terminate secondary low voltage wire runs at all door control devices supplied by this section, including but not limited to; door operators, magnetic locks, push button code entry units (keypads), request to exit switches, electric strikes and any associated electrical equipment. Ensure system is tested and complete for Owner's use. Provide staff training for push button code system (keypads) including all programming function and maintenance.

.13 Hardware Distributor will instruct the installer as to how various newer or unusual items that are required to be installed for proper performance.

3.4 FIELD QUALITY CONTROL

.1 Perform bi-monthly on-site inspections during hardware installation and provide inspection reports listing progress of work, unacceptable work and corrective measures. Repair or replace as directed by the Consultant.

.2 Upon completion of hardware installation, arrange with the Owner to instruct the Owner's personnel in the proper operation, adjustment, and maintenance of all finish hardware supplied under this Contract.

.3 Before completion of the Work but after finish hardware installation has been completed, submit a certificate to the Consultant stating that final inspection has been made and that all hardware has been checked for installation and operation by representatives of both the Hardware Supplier and the Hardware Distributor, and that operation and maintenance of all hardware have been fully demonstrated to the satisfaction of the Owner's personnel.

3.5 ADJUSTING AND CLEANING

.1 Check and make final adjustments to each operating item of hardware on each door to ensure proper operation and function.

.1 All hardware to be left clean and free of disfigurements.

.2 Check all locked doors against approved keying schedule.

3.6 PROTECTION

.1 Protect hardware from damage during construction period by removing and reinstalling or where necessary, using temporary hardware to maintain finish in new condition and maintain manufacturers warranty.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide glass and glazing for:

.1 Exterior doors, and screens.

.2 Section includes but is not limited to the provision of:

.1 Glass
.2 Glazing Film
.3 Glazing sealants, tapes, and backing materials
.4 Miscellaneous glazing materials necessary to complete the work of this section

1.3 REFERENCE STANDARDS

.1 ANSI/ASTM E330; Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
.2 ASTM C509; Standard Specification for Elastomeric Cellular Gasket and Sealing Material.
.3 ASTM C864; Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
.4 ASTM C920; Specification for Elastomeric Joint Sealants.
.5 ASTM C1115; Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories.
.6 ASTM D2240; Test Method for Rubber Property - Durometer Hardness.
.7 ASTM E84; Test Method for Surface Burning Characteristics of Building Materials.
.8 CAN/CGSB-12.1; Tempered or Laminated Safety Glass.
.9 CAN/CGSB-12.8; Insulating Glass Units.
.10 CAN/CGSB-12.20; Structural Design of Glass for Buildings.
.11 Flat Glass Manufacturers Association (FGMA) Glazing Manual.

1.4 PERFORMANCE REQUIREMENT

.1 Provide continuity of building enclosure vapour and air barrier using glass and glazing material as follows:

.1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.

.2 Size glass to withstand wind loads, dead loads and positive and negative live loads acting normal to plane of glass to a design pressure measured in accordance with the Ontario Building Code and CAN/CGSB-12.20.

.3 Limit glass deflection to flexural limit of glass with full recovery of glazing materials.

.4 Provide thermal stress analysis for all single glazed lites and all sealed glass units. Make recommendations for additional heat treatment, thickness change, or other required modifications prior to ordering of materials or manufacture of sealed glass units.

1.5 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Applicsation

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:

.1 Contractor (Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.6 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.

1.7 MAINTENANCE DATA

.1 Provide maintenance data including cleaning instructions for incorporation into Operations and Maintenance manual.

1.8 EXTENDED WARRANTY

.1 Provide sealed glass unit manufacturer's warranty certificate stating that the factory-sealed insulating glass units specified under this section are guaranteed against failure of seal of enclosed air space and deposits on inner faces of glass detrimental to vision, for a period of ten (10) years from the Date of Substantial Performance.

2 PRODUCTS

2.1 FLAT GLASS

.1 Safety Glass

.1 Tempered (TGL): to CAN/CGSB-12.1, tong-free, roller marks free, with visible after installation factory-applied permanent impression in one corner identifying each pane as tempered. Thickness as indicated in schedules and on drawings.

.2 Sealed Insulating Glass Units: to CAN2-12.8 and composed of two lites of minimum 6 mm thick glass separated by a 13mm wide "warm edge" spacer, double sealed and atmospheric pressure equalized to prevent bowing of the glass lites in the vertical position. All units shall be Argon Gas filled. Edges of glass shall be straight cut, free of nicks and other imperfections conducive to breakage. 25mm overall thickness for double glazed units. U-Value of 0.24, and SHGC of 0.27 for sealed glass units.

.1 Vision Units (GL-1): Double-glazed, double sealed insulating glass units, clear tempered glass outer lite, and tempered inner lite.

2.2 GLAZING MATERIALS

.1 Glazing Films

.1 Film Coatings for glass, 75 micron thick film, white semi-transparent, self-adhesive, as supplied by Convenience Group Inc., Toronto ON; 3M Fasara SH2MAML Milky White Film.

.2 Setting Blocks: EPDM or Neoprene, 80 – 90 (Shore A) durometer hardness to ASTM D2240, to suit glazing method, glass weight, and area.

.3 Spacer Shims: EPDM or Neoprene, 50 – 60 (Shore A) durometer hardness to ASTM D2240, 75mm long x one half height of glazing stop x thickness to suit application. Self adhesive on one face.

.4 Glazing Tapes

.1 Compression: 100% solids, preformed macro-polyisobutylene/butyl rubber with integral synthetic rubber spacing rod; coiled on release paper; size as required for frame stop heights; POLYSHIM II, by Tremco.

.2 Non-compression: 100% solids, preformed butyl rubber to ASTM C1281, 66 (Shore 00) durometer hardness to ASTM D2240; coiled on release paper; size as required for frame stop heights; Tremco 440 tape.

.5 Glazing Sealants

.1 Cap Beads

.1 Commercial Glazing: single or multi-component, non-acid curing silicone sealant to ASTM C920;

.1 One part neutral cure silicone; equivalent to Spectrem 2, by Tremco.

.2 Heel and Toe Beads

.1 Commercial Glazing: single or multi-component, non-acid curing silicone sealant to ASTM C920;

.1 One part medium modulus silicone sealant; equivalent to Tremsil 600, by Tremco.

.3 Perimeter Seals

.1 Single or multi-component, elastomeric sealant to ASTM C920;

.1 One part neutral cure silicone; equivalent to Spectrem 2, by Tremco.

.2 One part low modulus neutral cure silicone; equivalent to Spectrem 3, by Tremco.

2.3 GLAZING ACCESSORIES

.1 Glazing Clips: manufacturer's standard type.

2.4 SEALED GLASS UNIT FABRICATION

.1 Fabricate sealed glass units through the Insulating Glass Manufacturers Association of Canada Certification Program to CAN/CGSB 12.8. Sealed units shall bear IGMAC Certified Products List number and be properly identified.

3 EXECUTION

3.1 EXAMINATION

.1 Verify that openings for glazing are correctly sized and within tolerance.

.2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

3.2 PREPARATION

.1 Clean contact surfaces with solvent recommended for use by the sealant manufacturer, and wipe dry thoroughly.

.2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.

.3 Prime surfaces scheduled to receive sealant.

3.3 EXTERIOR GLAZING

.1 Steel Frames - Tape / Sealant

.1 Cut glazing tape to length and set against permanent stops, 3mm below sight line. Seal corners by butting tape and dabbing with sealant.

.2 Place setting blocks at 1/4 points, with edge block maximum 150mm from corners.

.3 Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of light or glass unit.

.4 Install removable stops with spacer strips inserted between glazing and applied stops below sight line. Place glazing tape on glazing light or unit with tape 6mm below sight line.

.5 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, maximum 6mm below sight line.

.6 Apply cap bead of sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

.2 Glazing Film Installation
- .1 Clean glass to receive film, thoroughly and let dry.
- .2 Install plastic film in accordance with film manufacturer's instructions.
- .3 Remove all air bubbles, creases or visible distortion.
- .4 Fit tight to glass perimeter. Do not leave clear gaps.
- .5 Install glazing film on interior of transoms where indicated on the drawings.

3.4 CLEANING & PROTECTION

.1 During installation, remove all corrosive or foreign materials or droppings resulting from work of this trade.

.2 Perform initial cleaning operation of all glass and mirrors upon completion of installation. Do not remove labels or protective films until time of final cleaning.

.3 After initial cleaning, mark large lites with an "X" by using removable plastic tape. Do not use masking tape. Do not mark heat absorbing or reflective glass units.

.4 Provide instructions for the proper method and materials to be used in the cleaning and maintenance of finished surfaces. Remove all remaining labels and protective films at time of final cleaning.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide gypsum board systems including the following:
- .1 Steel ceiling suspension systems
- .2 Gypsum board
- .3 Taping & Jointing
- .4 Accessories

1.3 REFERENCES

.1 ASTM C473; Test Methods for Physical Testing of Gypsum Panel Products.
.2 ASTM C475; Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
.3 ASTM C630/C630M; Specification for Water-Resistant Gypsum Backing Board.
.4 ASTM C645; Specification for Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board.
.5 ASTM C840; Specification for Application and Finishing of Gypsum Board.
.6 ASTM C954; Specification for Steel Drill Screws for the Application of Gypsum Board.
.7 ASTM C1002; Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases.
.8 ASTM C1047; Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
.9 ASTM C1395/C1395M; Specification for Gypsum Ceiling Board.
.10 ASTM C1396/C1396M; Specification for Gypsum Board.
.11 ASTM D3273; Test Method for Resistance to Mold Growth on the Surface of Interior Coatings in an Environmental Chamber.
.12 ASTM-E90; Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
.13 ASTM-E119; Test Methods for Fire Tests of Building Construction and Materials.
.14 CAN/CGSB-51.34; Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
.15 CAN/CGSB-71.25; Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.
.16 CAN/ULC-S102; Building Materials and Assemblies, Standard Method of Test for Surface Burning Characteristics of.

.17 CAN/ULC-S114; Determination of Non-combustibility of Building Materials.
.18 CAN/CSA-S136; Cold Formed Steel Structural Members.

1.4 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:

.1 Contractor (Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.5 SUBMITTALS

.1 Samples: Submit samples in accordance with Section 01 30 00.

.2 Submit duplicate 300mm x 300mm samples of the Gypsum Rendering finish system, on 16mm gypsum board. Samples shall show all materials, application and specified finish.

1.6 SYSTEM REQUIREMENTS

.1 Performance Requirements: Fabricate and install systems as indicated but not less than that required to comply with ASTM C754 under the following conditions:

.1 Systems to receive water resistant gypsum board or abuse resistant board: Maximum deflection of l/360 of partition height.

.2 Interior suspended ceilings: Maximum deflection of l/360 of distance between supports.

.3 Exterior soffits and interior ceilings: Withstand minimum positive and negative pressure of 0.95kPa with maximum deflection of l/360 of distance between supports.

.2 Fire Resistance Ratings: Where fire resistance classifications are indicated, provide materials and application procedures identical to those listed by UL/ULC or tested according to ASTM-E119 for type of construction shown.

.3 Acoustical Ratings: Where sound ratings are indicated, provide materials and application procedures identical to those tested by manufacturer to achieve Sound Transmission Class (STC) scheduled or indicated in accordance with ASTM-E90.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver material to site promptly without undue exposure to weather.

.2 Deliver in manufacturer's unopened containers or bundles, fully identified with name, brand, type and grade.

.3 Store above ground in dry, ventilated space.

.4 Protect materials from soiling, rusting, or damage.

.5 Store board to be directly applied to masonry walls at 21°C for 24 hours prior to installation.

1.8 ENVIRONMENTAL REQUIREMENTS

.1 Maintain temperature minimum 10°C, maximum 21°C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.

.2 Apply board and joint treatment to dry, frost-free surfaces.

1.9 SEQUENCING

.1 Co-ordinate installation of ceiling suspension systems with work of mechanical and electrical trades. Allow for completion of major items of work by mechanical and electrical trades prior to installation of ceiling grid systems.

2 PRODUCTS

2.1 STEEL MATERIALS

.1 Sheet Steel: Cold-rolled, commercial grade structural quality sheet steel (SS), to ASTM A924/A924M; Zinc-Coated (Hot Dip Galvanized) to ASTM A653/A653M; coating designation Z275.

2.2 FLAT CEILING SUSPENSION SYSTEM

.1 Suspension System: tested in accordance with ASTM C635, roll formed from hot-dip galvanized, sheet steel; USG Drywall Suspension System by CGC Inc., or an approved alternative, and as follows:

.1 Main Tees: 38mm x 38mm, single web construction.
.2 Wall-to-Wall Main Tees: 38mm x 38mm, single web construction.
.3 Cross Tees: 38mm x 38mm, single web construction.
.4 Cross Channels: 73x22mm, with 37mm face width.
.5 Wall Channels: 40x25mm, "C" channel.
.6 Wall Molds: 38 x 25mm "L" profile.

.2 Splice and Transition clips: purpose-made, roll formed from hot-dip galvanized steel sheet by USG, or an approved alternative.

.3 Suspension wire: 2.75mm galvanized wire.

2.3 BOARD MATERIAL

.1 Moisture Resistant Gypsum Board: to ASTM C36, with water resistant facing, Type X to ASTM E119, 16mm thick, 1220mm wide x maximum practical length;

.1 M2Tech® Moisture and Mold Resistant Type X Gypsum Board, by CertainTeed Gypsum Canada Inc.
.2 Sheetrock Mold-Tough Panels, by CGC Inc.
.3 or approved equivalent.

2.4 ACCESSORIES

.1 Hanger Wire: 4.8mm galvanized pencil rod.

.2 Screws

.1 For interior board: #6 or #8 bugle head, to ASTM C954, hardened and phosphate plated, drywall screws. Use self-drilling type for heavier thickness framing material.

.3 Corner Beads: 0.53mm thick, commercial grade, hot-dip galvanized sheet steel, to ASTM C645, perforated flanges, one piece length per location, refer to drawings for details and locations;

.1 "D-100" series, by Bailey Metal Products.

.4 Polyethylene: to CAN/CGSB-51.34.

.5 Acoustical Sealant: to Section 07 92 00.

.6 Firestop and Smoke Sealants: to Section 07 84 00.

.7 Joint Compounds: to ASTM C475, dry powder for mixing with water, or ready-mix compounds;

.1 Standard Interior Use Joint Compound (Ceiling applications)

.1 DensArmor™ Sandable Joint Compound, by Georgia-Pacific.
.2 ProFin Taping and Joint Compound, by CertainTeed Gypsum Canada Inc.
.3 Sheetrock Setting-Type Joint Compound, by CGC Canada Inc.

.8 Water: potable.

3 EXECUTION

3.1 GENERAL

.1 Perform work in accordance with ASTM C840 except where specified otherwise.

3.2 CEILING SYSTEM INSTALLATION

.1 Erect metal framing to tolerance of 1:1200.

.2 Install perimeter wall molds or channels level and straight, above elevation equal to thickness of board ceiling finish.

.3 Install main channels/tees in parallel rows 1220mm o.c., supported on hanger wire at maximum 1220mm o.c. Align cross channel slots from one main runner to the next. End splices must be fully interlocked.

.4 Install cross channels perpendicular to hanger channels at 405mm o.c. for moisture resistant board, soffit panels, and cement board; 610mm o.c. for all other. Screw fasten ends of furring channels to wall angles.

.5 Provide wind support posts at 1220mm o.c. each way at exterior soffit applications.

.6 Install additional cross channels within 200mm of parallel running walls where wall moulds or angles are not present.

.7 Install cross channels parallel to, and at exact locations of steel stud partition header track.

.8 Install standard cross tees at long edges of all rectangular light fixtures.

.9 Frame openings and around built-in equipment, cabinets, access panels, on four sides with cross tees. Extend framing into reveals. Check clearances with equipment suppliers.

.10 Ceiling suspension system shall not be used as primary support for mechanical/electrical equipment, other than those items penetrating the ceiling membrane or, to be installed on the underside of the ceiling. Other equipment must have its own support system.

3.3 BOARD APPLICATION

.1 Do not apply gypsum board until bucks, anchors, blocking, electrical and mechanical work are approved.

.2 Apply single layer gypsum board to framing using screw fasteners. Maximum spacing of screws 305mm o.c.

.3 Apply moisture resistant gypsum board to all ceilings. Apply silicone sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads.

3.4 INSTALLATION OF ACCESSORIES

.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full-length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure with screws at 152mm o.c., or using contact adhesive for full length.

.2 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.

.3 Construct control joints of back-to-back casing beads, set in gypsum board facing and supported independently on both sides of joint.

.4 Install access doors to electrical and mechanical equipment where specified by Mechanical and Electrical subtrades. Rigidly secure frames to furring or framing systems.

3.5 TAPING AND JOINTING

.1 Provide levels of gypsum board finish for locations as follows, in accordance with Gypsum Association GA 214, Recommended Specification: Levels of Gypsum Board Finish.

.1 **Level 1**: Ceiling plenum and concealed areas, except provide higher level of finish as required to comply with fire resistance ratings and acoustical ratings.
.2 **Level 2**: Gypsum board substrate at tile, except remove tool marks and ridges.
.3 **Level 3**: Gypsum substrate under textured or applied coatings such as plaster.
.4 **Level 4**: Gypsum board surfaces to receive paint finish.

.2 Interior Gypsum Board

.1 Pre-fill

.1 Use setting-type joint compound. Mix joint compound according to manufacturer's directions.
.2 Fill joints between boards flush to top of eased or beveled edge.
.3 Fill joints of gypsum board above suspended ceilings in fire-rated partitions.
.4 Wipe off excess compound and allow compound to harden.

.2 Taping (Level 1)

.1 Butter taping compound into inside corners and joints.
.2 Center tape over joints and press down into fresh compound.
.3 Remove excess compound.
.4 Tape joints of gypsum board above suspended ceilings.

.3 First coat (Level 2)

.1 Use taping or all-purpose drying-type compound.
.2 Immediately after bedding tape, apply skim coat of compound and allow to dry completely in accordance with manufacturer's instructions.
.3 Apply first coat of compound over flanges of trim and accessories, and over exposed fastener heads and finish level with board surface.

.4 Second coat (Level 3)

.1 After first coat treatment is dried, apply second coat of compound over tape and trim, feathering compound 2 inches beyond edge of first coat.

.5 Third coat (Level 4)

.1 After second coat has dried, sand surface lightly and apply thin finish coat to joints, fasteners and trim, feathering compound 2 inches beyond edge of second coat.
.2 Allow third coat to dry. Apply additional compound, and touch-up and sand, to provide surface free of visual defects, tool marks, and ridges, and ready for application of finish.

.3 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.

.4 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

.5 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide tiling to floors and walls where scheduled.

1.3 REFERENCE STANDARDS

.1 ANSI A108 Series; Specifications for Installation of Ceramic Tile.
.2 ANSI A118 Series; Specifications for Mortars and Grouts for Ceramic Tile Installation.
.3 ANSI A136.1; Standard for Organic Adhesives for Installation of Ceramic Tile.
.4 ANSI A137.1; Recommended Standard Specifications for Ceramic Tile.
.5 ASTM C1027; Determining visible abrasion resistance of glazed ceramic tile.
.6 ASTM C1028; Determining the static coefficient of ceramic tile.
.7 ASTM C920; Elastomeric joint sealants.
.8 CAN/CGSB-75.1; Ceramic tile.
.9 Ceramic Tile Installation Manual 200; Terrazzo Tile and Marble Association of Canada (TTMAC).
.10 Handbook for Ceramic Tile Installation; Tile Council of America.

1.4 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:

.1 Contractor (Site Superintendent & Project Manager)

.2 Application Subcontractor (Site Foreman & Project Manager)

.3 Product Manufacturer and/or Distributor (Technical Representatives)

.4 Related Subcontractors whose work is affected by that of this Section.

1.5 SUBMITTALS

.1 Make Submittals in accordance with Section 01 30 00.

.2 Samples

.1 Submit sample panels of each tile type specified. Sample panels shall be minimum 600mm x 600mm in size, and shall consist of tiles bonded to 13mm G1S plywood, with grouted joints to represent project installation. Where cut tile patterns are indicated, include one sample of cut condition. Sample boards shall include installation of corner conditions and other trim locations.

.2 Submit samples of preformed bases, trim and other specialty shapes.

.3 Shop Drawings

.1 Pool Tiling Plans: Prior to ordering tile, submit tiling plans. Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces. Indicate alignment with architectural details such as toilet partitions.

.2 Submit tiling plans in sufficient time to allow for review and ordering of tiles so as not to cause delay in the Work.

.3 Indicate tile layout, patterns, colour arrangement, perimeter conditions, junctions with dissimilar materials, control joints, expansion joints, thresholds, and setting details.

.4 Indicate tile layout for areas that include tile signage.

.5 Indicate locations of access doors, toilet compartments and plumbing fixtures.

1.6 MAINTENANCE MATERIAL

.1 Provide minimum 2% of each type and colour of tile required for project for maintenance use in accordance with Section 01 78 00.

.2 Maintenance material to be of same production run as installed material.

.3 Provide instructions for the care and maintenance of all tile for this project, for inclusion in Operations and Maintenance Manual.

1.7 ENVIRONMENTAL CONDITIONS

.1 Maintain air temperature and structural base temperature at ceramic tile installation area above 10°C for 48 hours before, during, and 48 hours after installation.

.2 Exclude construction traffic from areas to receive tile during installation and curing period.

.3 Protect tile flooring subjected to construction traffic with non-staining covers.

1.8 EXTENDED WARRANTY

.1 Provide Mortar and Grout manufacturer's system warranty guaranteeing that the listed products, installed as per the manufacturer's approved methods and practices, will not fail due to material or manufacturing defects for a period of five (5) years from the Date of Substantial Performance.

.2 Warranty shall cover the total replacement cost (all labour and materials) of the defective area.

2 PRODUCTS

2.1 TILE MATERIALS

.1 CT: Porcelain Floor Tile:

.1 Tile Size (nominal): 600mm x 600mm
.2 Pattern/Series: Regal Series.
.3 Colour: as selected by the Consultant.
.4 Finish: Matte.
.5 Supplier: Olympia Tile.
.6 Special Shapes: Provide 100mm high REL base tiles.

2.1 MORTAR AND ADHESIVE MATERIALS

.1 Large Format Tile Mortar: latex-modified Portland cement mortar, to ANSI 118.4. Acceptable products are:

.1 Ultraflex LFT by Mapei Inc.
.2 Laticrete® 220/333, by Laticrete International Inc.
.3 TEC™ Ultimate Large Tile Mortar 382/383, by H.B Fuller Construction Products Inc.
.4 ProLite™ Tile and Stone Mortar, by Custom Building Products.
.5 ARDEX X77™ MICROTEC® Fibre-Reinforced Thin Set Mortar, by Ardex Engineered Cements.

2.3 GROUT

.3 Epoxy Grout: two-component, 100% solids epoxy grout, to ANSI 118.6. Colours as selected by Consultant. Acceptable Products are:

.1 Kerapoxy®, by Mapei Inc.
.2 SpectraLOCK® PRO, by Laticrete International Inc.
.3 TEC AccuColor EFX™, by H.B. Fuller Construction Products Inc.
.4 CEG 2000™, by Custom Building Products.
.5 ARDEX WA™ Epoxy Grout/Adhesive, by Ardex Engineered Cements.

2.4 ACCESSORIES

.1 Floor Patch & Leveller: latex-modified cement floor patch and leveller. Acceptable products are;

.1 Planipatch, by Mapei Inc.
.2 TEC™ VersaPatch TA-327, by H.B Fuller Construction Products Inc.
.3 Laticrete® 816 Latipatch Rapid Underlayment, by Laticrete International Inc.
.4 ARDEX Liquid BackerBoard™ Underlayment, by Ardex Engineered Cements.

.2 Sealant: neutral-cure, non-sag, 100% silicone sealant, mold and mildew resistant; colour to match grout. Acceptable Products are:

.1 ARDEX SX™ Silicone Sealant, by Ardex Engineered Cements.
.2 TEC 100% Silicone, by H.B Fuller Construction Products Inc.

.9 Transitions: anodized aluminum finish;

.1 Floor Tile Base Cap: Schluter®-SCHIENE-AE, by Schluter Systems (Canada) Inc.

2.5 MORTAR MIXES

.1 Thin Set System: (1.6gal) 7.6L polymer additive to (50lb) 22.7kg powdered mortar mix.

.2 Mix as per manufacturer's instructions.

.3 Measure mortar ingredients by volume. Mix thoroughly to smooth, homogeneous consistency.

.4 Use low speed mixer (150 rpm). Avoid air entrapment and prolonged mixing.

.5 Let slake 10 to 15 minutes. Re-stir without adding liquid.

3 EXECUTION

3.1 SURFACE PREPARATION

.1 Ensure substrates are dry, clean, and free of all oil, grease and other materials detrimental to the installation of setting bed materials.

.2 Ensure substrates are sound, level, free of cracks greater than 3mm in width, and changes in elevation that may adversely affect installation.

.3 Apply levelling or patch material to vertical and horizontal substrates as recommended by mortar and grout manufacturer and allow to set thoroughly. Sand where necessary. Apply leveling coat to masonry and concrete surfaces to achieve sufficiently flat substrate for tiling, with no waves, ridges or bumps.

3.2 QUALITY OF WORK

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

.2 Maximum surface tolerance (1:800).

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

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

.5 Make joints between tile uniform and approximately 3mm wide, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.

.6 Make inside corners square butt joints, and outside corners bullnosed.

.7 Use return edged (bullnosed) tiles at termination of wall tile panels, except where panel butts projecting surface or differing plane.

.8 Clean installed tile surfaces after installation and grouting cured.

3.3 TILE INSTALLATION

.1 Apply setting bed material with a clean, round or square-notched trowel of type recommended for that material. Do not apply more material than can be covered with tiles in 10 minutes (approx. $1m^2$).

.2 Place tiles firmly into setting bed using a slight twisting motion to ensure full contact. Immediately beat-in tile to flatten all ridges or notches.

.3 Clean out joints of excess mortar, and wipe smudges from tile face.

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

3.4 GROUTING

.1 Prior to commencing floor tile grouting, apply grout release to tiles to protect from grout stain, and allow sufficient time to dry.

.2 Dampen surface of tile with a damp towel. Do not flood or overly wet tiles.

.3 Using a purpose-made rubber float, apply grout evenly by moving across tiles diagonally first in one direction and then in the opposite direction, to ensure joints are filled with material. Promptly remove excess grout as the work progresses, using rubber float.

.4 Remove remaining grout using dampened towel and clean water, by repeatedly dragging towel across the surface of the tiles, rinsing the towel and changing the water frequently.

.5 Allow grout to cure minimum 3 to 4 hours before cleaning off remaining grout "haze".

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to cover with paint the surfaces of the building or structure, and the building services and accessories not otherwise protected or covered, to the full intent of the drawings and specifications.

.2 Surface preparation of substrates to receive painting and finishing is included in this section of work.

.3 This section of work shall include the painting and finishing of all exposed surfaces of the following substrates:

.1 Steel (Prime painted)
.2 Steel (Galvanized)

1.3 REFERENCE STANDARDS

.1 CAN2-85.100, National Standards of Canada, Painting.
.2 Master Painters Institute (MPI) Architectural Painting Specification Manual.

1.4 MATERIALS AND EQUIPMENT NOT TO BE PAINTED

.1 Surfaces not to be painted shall be left completely free of droppings, over-spray, or accidentally applied materials resulting from the work of this Section.

.2 Items not to be painted include concealed structural elements, and equipment furnished with complete factory-applied, coloured paints and finish systems.

1.5 COOPERATION WITH OTHER TRADES

.1 Schedule and coordinate this work with other trades and do not proceed until other work and/or job conditions are as required to achieve satisfactory results.

.2 Examine all specification sections for materials and products, and become thoroughly familiar with all provisions regarding painting.

1.6 QUALITY ASSURANCE

.1 Material Manufacturers

.1 All paint and finish products shall be those listed in the Approved Products List of the MPI manual, latest edition unless otherwise specified or listed herein.

.2 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:

.1 Contractor (Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.7 MOCK-UP REQUIREMENTS

.1 Finish one complete exterior element of each colour scheme required, showing selected materials, colours and textures. Have Consultant review mock-up for acceptance of colour and finish, prior to ordering of materials for further work.

.2 Consultant reserves the right to change colour and/or finish selection upon review of mock-up, if deemed unacceptable.

.3 Refinish rejected areas until acceptance is achieved.

.4 Once approved by the Consultant, mock-ups shall serve as the minimum acceptable standard for similar work throughout the Project.

1.8 COLOUR SCHEDULE

.1 The Consultant will prepare a colour schedule as the job progresses. The final selection of colours and surface textures of all finishes throughout shall rest solely with the Consultant.

1.9 COMPLETION SCHEDULE

.1 Furnish the Consultant with a schedule showing expected completion of the respective coats of paint for the various areas and surfaces. Keep this schedule current as the job progresses.

1.10 SUBMITTALS

.1 Product Codes

.1 Submit a complete list of product codes from the manufacturer(s) proposed for use on this project, for all Products listed in finish systems specified herein, in accordance with Section 01 30 00.

.2 Samples

.1 Submit samples of all finishes specified herein, in accordance with Section 01 30 00.

.2 Submit duplicate (8" x 12") 200 x 300mm sample panels of each type of paint and finish application for approval by the Consultant.

.3 Where manufacturer of paint differs from that listed in the colour schedule, employ spectrograph technology to ensure accurate colour match. Selection of the "next nearest colour" by another manufacturer will not be acceptable.

.4 Finished work to match approved samples.

1.11 DELIVERY, STORAGE AND HANDLING

.1 Paint and finish materials shall be delivered to the site in sealed original labelled containers bearing manufacturer's name, type of paint, brand name, colour designation and instructions for mixing and/or reducing.

.2 Store materials in a heated, dry, well-ventilated, indoor place having a minimum ambient temperature of (45°F) 7°C.

.3 Keep waste rags in metal drums and remove all rags, waste and trash from the building at the end of each working shift.

.4 Provide CO_2 fire extinguisher of minimum (20 lb) 9kg capacity in storage area.

.5 Ensure that health and fire regulations are complied with in storage area.

1.12 GENERAL COLOUR REQUIREMENTS

.1 Refer to the Drawings and Schedules for types and extent of finishes, and to the Colour Schedule for individual colour and gloss/sheen selections.

.2 Where manufacturer of paint differs from that listed in the colour schedule, employ spectrograph technology to ensure accurate colour match. Selection of the "next nearest colour" by another manufacturer will not be acceptable.

1.13 ENVIRONMENTAL CONDITIONS

.1 Temperatures: No painting shall be performed when substrate or ambient air temperatures are below (41°F) 5°C. Minimum allowable temperatures for application of Latex paints are (50°F) 10°C (exterior work).

.2 Relative humidity: shall not exceed 85%.

.3 Moisture content of substrates: Masonry and concrete materials shall be allowed to cure for a minimum of 28 days before application of paints. Substrates shall be measured by electronic moisture meter, to the following maximums:

.1 Masonry, concrete/concrete block: 12% for solvent based paints.

.2 Wood: 15%.

.4 Lighting: Painting shall not proceed unless a minimum of (15 cd/ft^2) 1.3 lx lighting is provided on the surfaces to be painted.

.5 Ventilation: All areas where painting is proceeding require adequate continuous ventilation and sufficient heating facilities to maintain temperatures above (45°F) 7°C for 24 hours before during and after paint application.

1.14 MAINTENANCE MATERIALS

.1 Supply Owner with one clearly identified, new and unopened gallon of each colour and type of paint, stain and varnish used for this work, in accordance with Section 01 78 00.

.2 All colour mixing codes must be clearly labeled, and colour numbers (P1, P2, etc.) must be marked on the container.

1.15 EXTENDED WARRANTY

.1 Provide upon completion of the work, a Warranty Certificate, in the name of the Owner, stating that the work of this section was performed in accordance with these specifications and the MPI manual (latest edition), and is warranted against defects in material or installation, for a period of two (2) years from Date of Substantial Performance.

2 PRODUCTS

2.1 MATERIALS

.1 Paint, varnish, stain, enamel, lacquer and fillers shall be of a type and brand herein specified and/or listed under Chapter 5 (Approved Products List) of the MPI manual.

.2 Paint materials such as linseed oil, shellac, turpentine, and any materials not specified herein but required for first class work with the finish specified shall be the highest quality product of an approved manufacturer. All materials shall be compatible with finish paint or coating materials.

2.2 MIXING

.1 Paints shall be ready-mixed unless otherwise specified, except that any coating in paste or powder form, or to field-catalyzed shall be field-mixed in accordance with the directions of its manufacturer. Pigments shall be fully ground and shall maintain a soft paste consistency in the vehicle during storage that can and shall be dispersed readily and uniformly by paddle to a complete homogeneous mixture.

.2 The paint shall have good flow and brush properties and shall dry or cure free of sags or runs to yield the desired finish specified.

2.3 GLOSS LEVELS

.1 MPI Gloss and Sheen Levels;	Gloss @60°	Sheen @85°
Level G1 – (Flat):	max. 5	max. 10.
Level G2 – (Velvet):	max. 10	10-35.
Level G3 – (Eggshell):	10-25	10-35.
Level G4 – (Satin):	20-35	min.35.
Level G5 – (Semi-Gloss):	35-70.	
Level G6 – (Gloss):	70-85.	
Level G7 – (High Gloss):	>85.	

3 EXECUTION

3.1 INSPECTION OF SURFACES

.1 Examine surfaces to receive paint finishes for defects which cannot be corrected by procedures specified herein, and which may result in unsatisfactory paint finishes. Report items to the Consultant and the Contractor in writing, prior to commencement of work of this section, or after initial prime coat shows defects in substrate.

.2 The application of subsequent prime and finish coats shall be construed as acceptance of the surfaces, and thereafter this subcontractor shall be fully responsible for satisfactory work as required herein.

3.2 PREPARATION OF SURFACES

.1 Refer to the MPI manual Chapter 3 for surface preparations not specified in this section.

3.3 PROTECTION

.1 Protect all adjacent surfaces from paint and damage resulting from the work of this section, and make good any damage caused by failure to provide such protection.

.2 Mask all adjacent finishes and surfaces with masking tape as required. Remove tape promptly after final finish coat has been applied and allowed to dry.

.3 Furnish sufficient drop cloths, shields and protective equipment to prevent spray or dropping from fouling surfaces not being painted or where painting has been completed.

.4 Cotton waste, cloths and material, which may constitute a fire hazard, shall be placed in closed metal containers and removed daily from the site.

.5 Remove and protect, prior to painting operations, all hardware, accessories, device plates, lighting fixtures, factory finished work, and similar items, or provide ample in-place protection such as masking tape. If removed, these items shall be labelled, stored, cleaned if necessary and re-installed following successful completion of the work in each area. Solvents detrimental to lacquer finishes are not to be used for cleaning these items.

3.4 APPLICATION

.1 Apply paints and coatings by currently accepted trade methods.

.2 Painting coats specified are intended to cover surfaces satisfactorily when applied in strict accordance with manufacturer's recommendations. Where proper coverage has not been attained, the Consultant may ask for additional coats as required, at no additional cost.

.3 Apply each coat at the proper consistency. Sand lightly between coats.

.4 Tint primers to same colour range as finish coats.

.5 Do not apply finishes on surfaces that are not sufficiently dry. Each coat of finish should be dry and hard before a following coat is applied unless specified otherwise by the manufacturer.

.6 Spraying of paint on exterior surfaces is strictly prohibited, unless specified herein, or as approved by the Consultant.

.7 Provide complete coverage and hide. When colour, stain, dirt or undercoats show through final coat of paint, provide additional coats until the paint film is of uniform finish, colour, appearance and coverage, at no additional cost to the Owner.

.8 Allow all coats to dry to manufacturer's recommendations before applying succeeding coats.

.9 Touch up all suction spots or "hot spots" in concrete after the application of the first coat, before applying the second coat.

.10 Barricade areas where finishing is in progress to prevent traffic or other activities, and otherwise protect work until dry. Post "Wet Paint" signs and remove when no longer required.

.11 Replace at the expense of this section, materials soiled or damaged by finishing materials which cannot be removed.

3.5 PAINTING AND FINISHING OF EXISTING MATERIALS AND SURFACES

.1 Remove, label and store, prior to re-painting of existing materials and surfaces the following items:

.1 Door hardware, and signage,

.2 Factory finished work,

.3 Signage where removable.

.2 Where such items are not removable, provide proper masking and protection prior to commencement of painting:

.3 Clean such items if deemed necessary by the Consultant, before being re-installed following successful completion of the work in each area. Solvents detrimental to lacquer finishes are not to be used for cleaning these items.

3.6 CLEAN-UP

.1 Upon completion of the work, remove all paint and varnish spots from floors, glass and other surfaces. Remove from the premises all rubbish and accumulated materials of whatever nature, not caused by others, and leave this work in clean, orderly and acceptable conditions.

3.7 PAINTING AND FINISHING SCHEDULE

.1 The following titles and code numbers refer to Chapter 2 of the MPI Manual, unless otherwise indicated for type of coating, grade, named products and their manufacturers.

.2 Exterior Painting & Finishing

.1 Metal Finishing Systems

.1 Non Fire-Rated Structural & Miscellaneous Steel (Shop-primed).

.1 High Performance Polyurethane Finish (2-component Epoxy / Polyurethane). Refer to Section 09 97 13.23.

.2 Galvanized Metals (not chromate passivated) – High Contact (Doors frames, railings balustrades, etc.) Premium Grade Finish.

.1 EXT. 5.3B; Alkyd (over cementitious primer), Gloss/Sheen – G5.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to cover with paint the interior surfaces of the building or structure, and the building services and accessories not otherwise protected or covered, to the full intent of the drawings and specifications.

.2 Surface preparation of substrates to receive painting and finishing is included in this section of work.

.3 This section of work shall include the painting and finishing of all exposed surfaces of the following substrates:

.1 Steel (Prime-painted & Galvanized)
.2 Concrete
.3 Masonry
.4 Gypsum board surfaces
.5 Exposed Mechanical and Electrical equipment (Conduit, Piping, Ductwork, etc. Including hangers)

1.3 REFERENCE STANDARDS

.1 CAN2-85.100, National Standards of Canada, Painting.
.2 Master Painters Institute (MPI) Architectural Painting Specification Manual.

1.4 MATERIALS AND EQUIPMENT NOT TO BE PAINTED

.1 Surfaces not to be painted shall be left completely free of droppings, over-spray, or accidentally applied materials resulting from the work of this Section.

.2 Items not to be painted include concealed structural elements, and equipment furnished with complete factory-applied, coloured paints and finish systems.

1.5 COOPERATION WITH OTHER TRADES

.1 Schedule and coordinate this work with other trades and do not proceed until other work and/or job conditions are as required to achieve satisfactory results.

.2 Examine all specification sections for materials and products, and become thoroughly familiar with all provisions regarding painting.

1.6 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 All paint and finish Products shall be those listed in the MPI manual, latest edition unless otherwise specified or listed herein.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.2 Journeymen: Qualified journeymen who have "Tradesman Qualification Certificate of Proficiency" engaged in painting work.

.3 Apprentices: Working under direct supervision of qualified trades person in accordance with trade regulations.

.3 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:

.1 Contractor (Site Superintendent & Project Manager)

.2 Application Subcontractor (Site Foreman & Project Manager)

.3 Product Manufacturer and/or Distributor (Technical Representatives)

.4 Related Subcontractors whose work is affected by that of this Section.

1.7 MOCK-UP REQUIREMENTS

.1 Finish one complete room of each colour scheme required, showing selected materials, colours and textures. Have Consultant review mock-up for acceptance of colour and finish, prior to ordering of materials for further work.

.2 Consultant reserves the right to change colour and/or finish selection upon review of mock-up, if deemed unacceptable.

.3 Refinish rejected areas until acceptance is achieved.

.4 Once approved by the Consultant, mock-ups shall serve as the minimum acceptable standard for similar work throughout the Project.

1.8 COLOUR SCHEDULE

.1 The Consultant will prepare a colour schedule as the job progresses. The final selection of colours and surface textures of all finishes throughout shall rest solely with the Consultant.

1.9 COMPLETION SCHEDULE

.1 Furnish the Consultant with a schedule showing expected completion of the respective coats of paint for the various areas and surfaces. Keep this schedule current as the job progresses.

1.10 SUBMITTALS

.1 Product Codes

.1 Submit a complete list of product codes from the manufacturer(s) proposed for use on this project, for all products listed in finish systems specified herein, in accordance with Section 01 30 00.

.2 Samples

.1 Submit samples of all paints and finishes specified herein, in accordance with Section 01 30 00.

.2 Submit duplicate (8" x 12") 200 x 300mm sample panels of each type of paint and finish application for approval by the Consultant.

.3 Where manufacturer of paint differs from that listed in the colour schedule, employ spectrograph technology to ensure accurate colour match. Selection of the "next nearest colour" by another manufacturer will not be acceptable.

.4 Use birch plywood for wood finishes, gypsum board for paint finishes over smooth surfaces.

.5 Finished work to match approved samples.

.6 The Consultant reserves the right to alter colour selections following sample review.

1.11 DELIVERY, STORAGE AND HANDLING

.1 Paint and finish materials shall be delivered to the site in sealed original labelled containers bearing manufacturer's name, type of paint, brand name, colour designation and instructions for mixing and/or reducing.

.2 Store materials in a heated, dry, well-ventilated, indoor place having a minimum ambient temperature of (45°F) 7°C.

.3 Keep waste rags in metal drums and remove all rags, waste and trash from the building at the end of each working shift.

.4 Provide CO_2 fire extinguisher of minimum (20 lb) 9kg capacity in storage area.

.5 Ensure that health and fire regulations are complied with in storage area.

1.12 GENERAL COLOUR REQUIREMENTS

.1 Refer to the Room Finish Schedule for type and extent of finishes, and to the Colour Schedule for individual colour and sheen selections.

.2 Where manufacturer of paint differs from that listed in the colour schedule, employ spectrograph technology to ensure accurate colour match. Selection of the "next nearest colour" by another manufacturer will not be acceptable.

.3 The following, generally, will be painted colour, and sheen to match adjacent surfaces

.1 Access doors

.2 Exposed piping, conduit and ductwork

.4 The following major items, generally, will be painted the same colour throughout the Work, but different colours from each other:
- .1 Doors and door frames
- .2 Ceilings
- .3 Walls
- .4 Exposed structural members and deck

.5 This subcontractor shall base their bid price on:
- .1 2 different colour schemes for the painting of rooms.
- .2 1 colour scheme for the painting of doors and frames.

1.13 ENVIRONMENTAL CONDITIONS

.1 Temperatures: No painting shall be performed when substrate or ambient air temperatures are below (41°F) 5°C. Minimum allowable temperature for application of Latex paints is (45°F) 7°C.

.2 Relative humidity: shall not exceed 85%.

.3 Moisture content of substrates: Masonry and concrete materials shall be allowed to cure for a minimum of 28 days before application of paints. Substrates shall be measured by electronic moisture meter, to the following maximums:
- .1 Plaster and Gypsum board: 12%.
- .2 Masonry, concrete/concrete block: 12% for solvent based paints.
- .3 Wood: 15%.

.4 Lighting: Painting shall not proceed unless a minimum of (15 cd/ft^2) 1.3 lx lighting is provided on the surfaces to be painted.

.5 Ventilation: All areas where painting is proceeding require adequate continuous ventilation and sufficient heating facilities to maintain temperatures above (45°F) 7°C for 24 hours before during and after paint application.

1.14 MAINTENANCE MATERIALS

.1 Supply Owner with one clearly identified, new and unopened gallon of each colour and type of paint, stain and varnish used for this work, in accordance with Section 01 78 00.

.2 All colour mixing codes must be clearly labeled, and colour, texture finish numbers (P1, P2, etc.) must be marked on the container.

1.15 EXTENDED WARRANTY

.1 Provide upon completion of the work, a Warranty Certificate, in the name of the Owner, stating that the work of this section was performed in accordance with these specifications and the MPI manual (latest edition), and is warranted against defects in material or installation, for a period of two (2) years from Date of Substantial Performance.

2 PRODUCTS

2.1 MATERIALS

.1 Paint, varnish, stain, enamel, lacquer and fillers shall be of a type and brand herein specified and/or listed under Chapter 5 (Approved Products List) of the MPI manual.

.2 Paint materials such as linseed oil, shellac, turpentine, and any materials not specified herein but required for first class work with the finish specified shall be the highest quality product of an approved manufacturer. All materials shall be compatible with finish paint or coating materials.

2.2 MIXING

.1 Paints shall be ready-mixed unless otherwise specified, except that any coating in paste or powder form, or to field-catalyzed shall be field-mixed in accordance with the directions of its manufacturer. Pigments shall be fully ground and shall maintain a soft paste consistency in the vehicle during storage that can and shall be dispersed readily and uniformly by paddle to a complete homogeneous mixture.

.2 The paint shall have good flow and brush properties and shall dry or cure free of sags or runs to yield the desired finish specified.

2.3 GLOSS LEVELS

.1 MPI Gloss and Sheen Levels;	Gloss @60°	Sheen @85°
Level G1 – (Flat):	max. 5	max. 10.
Level G2 – (Velvet):	max. 10	10-35.
Level G3 – (Eggshell):	10-25	10-35.
Level G4 – (Satin):	20-35	min.35.
Level G5 – (Semi-Gloss):	35-70.	
Level G6 – (Gloss):	70-85.	
Level G7 – (High Gloss):	)85.	

3 EXECUTION

3.1 INSPECTION OF SURFACES

.1 Examine surfaces to receive paint finishes for defects which cannot be corrected by procedures specified herein, and which may result in unsatisfactory paint finishes. Report items to the Consultant and the Contractor in writing, prior to commencement of work of this section, or after initial prime coat shows defects in substrate.

.2 The application of subsequent prime and finish coats shall be construed as acceptance of the surfaces, and thereafter this subcontractor shall be fully responsible for satisfactory work as required herein.

3.2 PREPARATION OF SURFACES

.1 Refer to the MPI manual Chapter 3 for surface preparations not specified in this section.

3.3 PROTECTION

.1 Protect all adjacent surfaces from paint and damage resulting from the work of this section, and make good any damage caused by failure to provide such protection.

.2 Mask all adjacent finishes and surfaces with masking tape as required. Remove tape promptly after final finish coat has been applied and allowed to dry.

.3 Furnish sufficient drop cloths, shields and protective equipment to prevent spray or dropping from fouling surfaces not being painted or where painting has been completed.

.4 Cotton waste, cloths and material, which may constitute a fire hazard, shall be placed in closed metal containers and removed daily from the site.

.5 Remove and protect, prior to painting operations, all hardware, accessories, device plates, lighting fixtures, factory finished work, and similar items, or provide ample in-place protection such as masking tape. If removed, these items shall be labelled, stored, cleaned if necessary and re-installed following successful completion of the work in each area. Solvents detrimental to lacquer finishes are not to be used for cleaning these items.

3.4 APPLICATION

.1 Apply paints and coatings by currently accepted trade methods.

.2 Painting coats specified are intended to cover surfaces satisfactorily when applied in strict accordance with manufacturer's recommendations. Where proper coverage has not been attained, the Consultant may ask for additional coats as required, at no additional cost.

.3 Apply each coat at the proper consistency. Sand lightly between coats.

.4 Tint primers to same colour range as finish coats.

.5 Do not apply finishes on surfaces that are not sufficiently dry. Each coat of finish should be dry and hard before a following coat is applied unless specified otherwise by the manufacturer.

.6 Tint filler to match wood for clear finishes. Work filler well into wood grain and remove excess prior to setting.

.7 Interior woodwork to receive paint or enamel finish shall be back-primed upon arrival on site with enamel undercoater.

.8 All edges of wood doors shall be primed with undercoater, stain, or varnish, as required by specified finish.

.9 Where spraying of paint is required by surface conditions, mask and seal off areas to be sprayed, and back-roll all coats. Provide ventilation for areas to be sprayed.

.10 Where spray painting is specified, finish ($100ft^2$) $10m^2$ by spraying a sample of the finish upon the request of the Consultant, using materials specified.

.11 Provide complete coverage and hide. When colour, stain, dirt or undercoats show through final coat of paint, provide additional coats until the paint film is of uniform finish, colour, appearance and coverage, at no additional cost to the Owner.

.12 Allow all coats to dry to manufacturer's recommendations before applying succeeding coats.

.13 Touch up all suction spots or "hot spots" in concrete after the application of the first coat, before applying the second coat.

.14 Surfaces to be stained shall appear uniform in shading with colour variations caused only by the natural wood grain.

.15 Barricade areas where finishing is in progress to prevent traffic or other activities, and otherwise protect work until dry. Post "Wet Paint" signs and remove when no longer required.

.16 Replace at the expense of this section, materials soiled or damaged by finishing materials which cannot be removed.

3.5 PAINTING AND FINISHING OF EXISTING MATERIALS AND SURFACES

.1 Remove, label and store, prior to painting of existing materials and surfaces the following items:

.1 Door hardware signage and accessories,
.2 Device plates,
.3 Lighting fixtures,
.4 Factory finished work,
.5 Signage where removable.

.2 Where such items are not removable, provide proper masking and protection prior to commencement of painting.

.3 Clean such items if deemed necessary by the Consultant, before being re-installed following successful completion of the work in each area. Solvents detrimental to lacquer finishes are not to be used for cleaning these items.

.4 All surface contaminants such as wax, oils, grease, dirt, tire marks (horizontal surfaces), etc., must be removed from the surface. Oil and grease can be removed by detergent cleaning, followed by a rinse with clean water; solvent cleaning can be used as an alternative on areas with a concentration of oil or grease. All loose and flaking paint must be removed by hand cleaning, power tool cleaning, or pressure washing.

.5 All blisters must be removed from the surface and the edges feathered. Areas showing mildew growth must be treated. Glossy finishes must be ‘dulled’ by sanding, by a TSP treatment, or by sweep blasting to create an anchor pattern to promote adhesion of the new coating.

.6 Rust stains can be removed with an oxalic acid treatment. If large amounts of efflorescence are present, mechanical removal (e.g. abrasive sweep blasting or power tool grinding) may be required, after which acid etching shall be performed.

.7 After any application of muriatic acid, the surface must be flushed with large amounts of clean water to remove any residue, and then allowed to dry thoroughly. The pH of the surface shall be tested, as specified in 1.2 pH Testing before the application of paint. All bare areas must be spot primed.

3.6 CLEAN-UP

.1 Upon completion of the work, remove all paint and varnish spots from floors, glass and other surfaces. Remove from the premises all rubbish and accumulated materials of whatever nature, not caused by others, and leave this work in clean, orderly and acceptable conditions.

3.7 PAINTING AND FINISHING SCHEDULE

.1 The following titles and code numbers refer to Chapter 4 of the MPI Manual, unless otherwise indicated for type of coating, grade, named products and their manufacturers.

.1 Concrete Horizontal Surfaces; Premium Grade Finish.

.1 INT. 3.2F; (FS) Concrete Floor Sealer, Gloss/Sheen – G3.

.2 Masonry Finishing Systems (raked joints may require spraying)

.1 Concrete Masonry Units; Premium Grade Finish.
.1 Epoxy Painted Block (EP)
.1 INT. 4.2G; Epoxy (tile-like, over epoxy block filler, for wet environments), Gloss/Sheen – G6.

.3 Metal Finishing Systems
.1 Metal Fabrications; Premium Grade Finish.
.1 INT. 5.1K (EP); Epoxy-Modified Latex (over rust-inhibitive primer), Gloss/Sheen – G4.

.2 Galvanized Metals (not chromate passivated) – High Contact (Doors frames, railings balustrades, etc.) Premium Grade Finish.
.1 INT. 5.3D (EP); Epoxy (over epoxy primer), Gloss/Sheen – G4.

.4 Plaster & Gypsum Board Finishing Systems
.1 Gypsum Board; Premium Grade Finish.
.1 INT. 9.2F (EP); Epoxy-Modified Latex (over latex primer sealer), Gloss/Sheen – G3.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide high performance coating for exterior structural and miscellaneous steel.

1.3 REFERENCE STANDARDS

.1 ASTM D2697; Test Method for Volume Non-volatile Matter in Clear or Pigmented Coatings.

1.4 SUBMITTALS

.1 Make submittals in accordance with Section 01 30 00.

.2 Product Data

.1 Submit product data for all Products specified herein.

.2 Submit WHMIS MSDS-Material Safety Data Sheets. Indicate VOC content.

.2 Samples

.1 Submit duplicate (8" x 8") 200 x 200mm samples of each colour and finish applied to galvanized sheet steel.

1.5 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:

.1 Contractor (Site Superintendent & Project Manager)

.2 Application Subcontractor (Site Foreman & Project Manager)

.3 Product Manufacturer and/or Distributor (Technical Representatives)

.4 Related Subcontractors whose work is affected by that of this Section.

1.6 DELIVERY, HANDLING AND STORAGE

.1 Deliver products to the site in original, unopened containers with manufacturer's labels intact. Labels shall indicate product designation, lot numbers and colour.

.2 Store products in cool, dry, well-ventilated area at (50 to 81°F) 10 to 27°C, and away from any open flame, spark or other heat source.

1.7 ENVIRONMENTAL REQUIREMENTS

.1 Ambient air and surface temperature shall be (40 to 120°F) 4 to 50°C at installation area for 24 hours prior to and 24 hours after application.

.2 Substrate temperature must be minimum (5°F) 3°C above dew point to prevent condensation.

.3 Applicators shall wear appropriate safety apparatus such as masks, gloves and protective eyewear and clothing.

.4 Provide adequate ventilation during mixing, application and curing.

1.8 SEQUENCING AND SCHEDULING

.1 Site application of polyurethane coating shall not commence until final welding is completed.

.2 For applications where site welding is not required, items to receive coating shall be shop-applied, spray finish.

.3 For applications where site welding is required, items to receive coating shall be site-applied, brush finish.

1.9 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for incorporation into Operations and Maintenance Manual.

1.10 EXTENDED WARRANTY

.1 Provide upon completion of the work, a Warranty Certificate, in the name of the Owner, stating that the work of this section was performed in accordance with these specifications and the MPI manual (latest edition), and is warranted against defects in material and installation, for a period of two (2) years from Date of Substantial Performance.

2 PRODUCTS

2.1 MATERIALS

.1 Primer (Prime Painted Steel): reinforced inorganic zinc primer; Catha-Coat 302H by DeVoe Coatings (ICI Canada Inc.).

.2 Epoxy Intermediate Coating (Primer for Galvanized Steel): Two-component, chemically-cured zinc-rich epoxy coating;
.1 Acceptable Products
.1 Amercoat™240, by Amercoat Canada Inc.
.2 Devran™ 223, by DeVoe Coatings (ICI Canada Inc.) .
.3 Carbozinc® 895 VOC, by Carboline Company.

.3 Polyurethane Top Coating: Two component, fast drying, aliphatic acrylic polyurethane. Colours shall be custom colours as selected by the Consultant.
.1 Acceptable Products
.1 Amershield™ VOC, by Amercoat Canada Inc.
.2 Devthane™ 379H, by DeVoe Coatings (ICI Canada Inc.) .
.3 Carbothane® 134 VOC, by Carboline Company.

2.2 MIXING
.1 Stir resin thoroughly and add cure to produce uniform mixture. Mixing ratio is 4 parts resin to 1 part cure by volume.

3 EXECUTION

3.1 PROTECTION
.1 Mask all adjacent surfaces against overspray and provide wind barriers when application is exterior.

3.2 SURFACE PREPARATION
.1 Galvanized steel: Remove oil, grease or soap film with neutral detergent or emulsion cleaner. Pre-treat as recommended by coatings manufacturer. Abrasive blast all surfaces to SSPC–SP-7.

.2 Prime Painted Steel: Remove all mill scale and rust. Abrasive blast where required to SSPC–SP-7. Touch up all affected areas with reinforced inorganic zinc primer.

.3 Coated Surface: Abrasive-blast surface or clean using solvent emulsion.

3.3 GALVANIZED STEEL
.1 Primer Coat: Apply one (1) coat epoxy coating to all galvanized steel surfaces by brush or spray application in accordance with manufacturer's instructions. Use zinc-rich epoxy primer as specified under Intermediate Coating above.

3.4 PRIME-PAINTED STRUCTURAL STEEL
.1 Primer Coat: Apply one (1) coat reinforced inorganic zinc primer to all prime painted steel surfaces by brush or spray application in accordance with manufacturer's instructions. Use reinforced inorganic zinc primer as specified under Primer above.

.2 Intermediate Coat: Apply one (1) coat intermediate epoxy coating to all prime-painted steel surfaces by brush or spray application in accordance with manufacturer's instructions.

3.5 TOP COAT APPLICATION
.1 General
.1 Apply topcoat to all exterior steel, in minimum two (2) coats, in 2 directions to ensure full even application.

.2 Apply coating to produce smooth surface, uniform in sheen, colour and texture, free from marks, dirt, particles, runs, crawls, curling, holes, air pockets and other defects.

.3 Application of (8 mil) 200 micron wet film thickness, shall produce minimum (5 mil) 125 micron dry film thickness.

.2 Brush-application
.1 Where brush-applied, remove brush lines and drips in coating.

.3 Spray-application
.1 Apply coating using airless or electrostatic spray equipment.

.2 Apply a wet coat in even, parallel passes, overlapping each pass 50%. If required, cross spray at right angles.

3.6 CLEANING
.1 Clean surfaces to coating manufacturer's printed instructions.

3.7 SCHEDULE
.1 Apply coating system to all exterior galvanized and prime painted structural and miscellaneous steel.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to Provide high-density polyethylene partitions;

.1 Toilet Compartments.

1.3 REFERENCE STANDARDS

.1 CAN/CSA-B651; Barrier Free Design.

.2 ASTM E84; Standard Test Method for Surface Burning Characteristics of Building Material.

.3 ASTM D2794; Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

.4 ASTM D2197; Standard Test Method for Adhesion of Organic Coatings by Scrape Adhesion.

.5 ASTM D6578; Standard Practice for Determination of Graffiti Resistance.

.6 National Fire Protection Association 101 Life Safety Code 2006 Edition, Chapter 10.

.7 ANSI A117; Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.

.8 ADA, Accessibility Guidelines for Buildings and Facilities, Federal Register Volume 56, Number 144, Rules and Regulations.

1.4 SYSTEM DESCRIPTION

.1 Toilet Partitions shall be ceiling-mounted, constructed of solid high-density polyethylene (HDPE).

1.5 PERFORMANCE REQUIREMENTS

.1 Graffiti Resistance: Partition material shall have the following graffiti removal characteristics when tested in accordance with ASTM D6578 Standard Practice for Determination of Graffiti Resistance in accordance with Section 9, “Graffiti Removal Procedure Using Manual Solvent Rubs”:

.1 Cleanability: Five (5) required staining agents shall be cleaned off material.

.2 Scratch Resistance: Partition material shall have the following characteristics when tested in accordance with ASTM D2197 Standard Test Method for Adhesion of Organic Coating

by Scrape Adhesion, using Gardner Stock #PA-2197/ST pointed stylus attachment on scrape tester:

.1 Scratch Resistance: Maximum Load Value shall exceed 10 kilograms.

.3 Impact Resistance: Partition material shall have the following characteristics when tested in accordance with ASTM D2794 Standard Test Method for Resistance of Organic Coating to the Effects of Rapid Deformation (Impact), using 0.625" hemispherical indenter with 2-lb impact weight:

.1 Impact Resistance: Maximum Impact Force value shall exceed 30 inch-lbs.

.4 Fire Resistance: Partition material shall comply with the following requirements, when tested in accordance with ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials:

.1 Smoke Developed Index: Not to exceed 450.
.2 Flame Spread Index: Not to exceed 75.
.3 Material Fire Ratings:
.1 National Fire Protection Association (NFPA): Class B.

1.6 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Documentation

.1 If requested by the Consultant, submit documentation to support the competency of firms and personnel.

.4 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:
.1 Contractor (Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.7 SUBMITTALS

.1 Make submittals in accordance with Section 01 30 00.

.2 Shop Drawings

.1 Submit shop drawings indicating fabrication details, plans, elevations, hardware, and installation details.

.3 Product Data

.1 Submit all product data for partition type specified, including panel composition, hardware, and colour ranges.

.4 Test Results Data
.1 If requested by the Consultant, submit copies of all test results confirming Product conformance with specified performance characteristics.

.5 Maintenance Data
.1 Provide maintenance data for maintenance of high-density polyethylene (HDPE) work for incorporation into Operations and Maintenance manual.

1.8 DELIVERY, STORAGE AND HANDLING
.1 Protect finished surfaces during shipment and installation by approved means. Do not remove until immediately prior to final inspection.

1.9 WARRANTY
.1 Provide a certificate from the manufacturer, warranting that high-density polyethylene (HDPE) will not warp, break, corrode or delaminate under normal use for fifteen (15) years from Date of Substantial Performance.

2 PRODUCTS

2.1 MATERIALS
.1 High Density Polyethylene: solid, high pressure, compression molded high-density polyethylene (HDPE), containing minimum 10% recycled material.

.2 Stainless Steel Sheet: Type 304, minimum (20 gauge) 0.95mm, with AISI No. 4 (satin) finish.

.3 Aluminum: extruded aluminum, clear anodized finish.

2.2 PLASTIC TOILET COMPARTMENTS
.1 High Density Polyethylene modular toilet compartments;
.1 Acceptable Products are:
.1 Solid Plastic Series, by Hadrian Manufacturing.
.2 Hiny Hiders®, by Scranton Products Inc., Scranton PA.
.3 Solid Plastic Series, by Global Partitions Inc. (ASI Group Watrous Canada) Pickering ON.
.4 Bradmar – Sentinel Series 400, by Bradley Washroom Equipment.

2.3 HARDWARE
.1 Hardware - Heavy Duty: Manufacturer's heavy-duty stainless steel, including stainless steel tamper-resistant fasteners:
.1 Hinges: Self-closing integral, nylon, gravity-type adjustable to hold doors open at any angle up to 90 degrees, with emergency access by lifting door.
.2 Latch and Keeper: Surface-mounted slide latch with flat rubber-faced combination door strike and keeper, with provision for emergency access, meeting requirements for accessibility at accessible compartments.
.3 Coat Hook: Safety Coat Hook (SCH): magnetic safety release coat hooks. Release Weight of (26 lbs. +/- 2 lbs.) 11.8 kg. +/-0.9 kg. Acceptable Products are:
.1 HenkelHook, by Henkel Diversified Inc.
.2 Model 1150 by Frost.
.4 Provide separate rubber wall bumper where door abuts wall or partition.

.5 Door Pull: Standard unit on outside of inswing doors. Provide pulls on both sides of outswing doors.
.6 Hinges: Gravity-activated, heavy duty, self-lubricating with nylon bushings. Adjustable to hold door open at any angle up to 90 degrees.
.7 Wall and connecting brackets: Bolt-through type.
.8 Wall Bumper: wall-mounted rubber, for out-swinging doors.
.9 Fasteners: stainless steel, tamperproof type screws and bolts.
.10 Colour: as selected by the Consultant from standard colours.

2.4 FABRICATION
.1 Partitions & Doors
.1 Fabricate partition doors, pilasters and panels of (1") 25mm thick high-density polyethylene (HDPE) with (1/4") 6mm radiussed edges, to sizes indicated.

.2 Fabricate pilaster shoes and brackets of matching high-density polyethylene (HDPE) with (1/4") 6mm radiussed edges, to sizes indicated.

3 EXECUTION

3.1 EXAMINATION
.1 Examine all support framing and ceiling installations, and ensure all construction is correct, complete and ready for partition installation.

.2 Report any and all deficiencies to the Contractor for correction, prior to commencing installation.

.3 Commencement of installation implies acceptance of conditions as found.

3.2 PARTITION ERECTION
.1 Perform barrier free installation in accordance with CAN/CSA-B651.

.2 Install partitions secure, plumb and square.

.3 Fabricate and install partition system to provide for maximum 3mm gap between all partitions, pilasters, and doors. All door openings shall continuous aluminum angle stops.

.4 Leave maximum 3mm space between wall and panels or end pilasters.

.5 Anchor continuous fixing brackets to masonry/concrete surfaces using screw/shield type anchors.

.6 Attach panel and pilaster to brackets with through type sleeve bolt and nut.

.7 Provide for adjustment of ceiling variations with screw jack through steel saddles made integral with pilaster. Conceal fixings with stainless steel shoes.

.8 Provide templates for locating threaded studs through finished ceilings.

.9 Equip each door with hinges, latch set, and coat hook/bumper mounted on door. Adjust and align hardware for proper function.

.10 Set inswing door open position at 90 degrees to front (full open). Set barrier free door position closed.

.11 Install wall mounted door bumper behind each out-swinging barrier free door.

.12 Equip barrier free doors with door pulls on both sides of doors.

3.3 CEILING SUPPORTED PARTITIONS

.1 Attach pilasters to steel ceiling brackets using leveling bolts. Set pilasters plumb to vertical and at uniform elevation across the bottom edges. Secure pilaster shoes in position.

.2 Set tops of doors level and at uniform elevation across the top, when doors are in closed position.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, Products, equipment and incidental services necessary to Provide all washroom accessories specified herein.

.2 Washroom accessories not specified herein, will be supplied and installed by the Owner.
- .1 Loose waste receptacles.
- .2 Paper towel dispensers.
- .3 Toilet paper dispensers.

1.3 REFERENCE STANDARDS

.1 ASTM A167; Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
.2 ASTM A525M; Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot Dip Process.
.3 ASTM A526M; Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot Dip Process, Commercial Quality.
.4 ASTM B456; Specification for Electro-deposited Coating of Copper + Nickel + Chromium and Nickel + Chromium.
.5 ASTM C1503; Specification for Silvered Flat Glass Mirror.
.6 CAN/CGSB-12.5; Mirrors, Silvered.
.7 CAN/CSA-B651; Barrier-Free Design.
.8 CAN/CSA-G164; Hot Dip Galvanizing of Irregularly Shaped Articles.

1.4 SHOP DRAWINGS

.1 Make submittals in accordance with Section 01 30 00.

.2 Product Data
- .1 Submit manufacturer's Product data for all items specified herein.
- .2 Indicate size and description of components, base material, surface finish inside and out, hardware and locks.

.3 Shop Drawings
- .1 Submit shop drawings of all items specified herein.

.2 Indicate attachment devices, description of rough-in frame, and building-in details of anchors for grab bars.

1.5 MAINTENANCE MATERIALS AND DATA

.1 Provide operation and maintenance data for washroom accessories for incorporation into Maintenance Manual in accordance with Section 01 78 00.

.2 Provide two (2) complete sets of special tools required for accessing, assembly/disassembly or removal of washroom accessories.

1.6 EXTENDED WARRANTIES

.1 Submit warranty certificates from Product manufacturer(s) as follows:

.1 Silver coating on mirrors – 15 years.

2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

.1 ASI Group Canada
.2 Bobrick Washroom Equipment of Canada
.3 Bradley Washroom Equipment
.4 Frost Washroom Equipment

2.2 MATERIALS

.1 Sheet Steel: commercial quality, to ASTM A526 with ZF001 zinc coating.

.2 Stainless Steel Sheet Metal: to ASTM A167, Type 304, minimum (22 gauge) 0.80mm thick.

.3 Stainless Steel Tubing: Type 304, commercial grade, seamless welded, (18 gauge) 1.27mm wall thickness.

.4 Glass for Mirrors: to CAN/CGSB-12.5 and ASTM C1503; (1/4") 6mm, film-coated tempered glass.

.5 Fasteners: concealed screws and bolts shall be tamper-proof, hot-dip galvanized or stainless steel; all exposed fasteners stainless steel to match face of unit. Use plastic or lead expansion shields as recommended by fixture manufacturer for component, and its intended use.

2.3 FINISHES

.1 Chrome and Nickel Plating: to ASTM B456, polished finish.

.2 Stainless Steel: AISI No. 4 finish, (satin).

2.4 COMPONENTS

.1 Framed Mirrors **(M)**: stainless steel channel frame, vandal-proof concealed fastenings, one unit per lavatory, One-piece, (1/2" x 1⁄2" x 3⁄8") 13 x 13 x 10mm channel-frame. Type 304 stainless steel with satin finish and mitered corners. (1⁄4") 6mm tempered mirror glass to ASTM C1503. Galvanized steel back. Secured to concealed wall hanger with theft-resistant (18 gauge) 1.214mm steel mounting brackets;

.1 **M.1:** (24" x 36") 610mm x 914mm, fixed angled frame for barrier-free application.

.1 Acceptable Products:

.1 B-293x2436, by Bobrick.

.2 Model 740-02436-2 by Bradley.
.3 Model 941FT-2436 by Frost
.4 Model 0535-B by ASI.

.2 Grab Bars **(GB):** (1¼") 32mm diameter, Type 304, (18 gauge) 1.27mm satin finish stainless steel tubing grab bars, with peened grip. Concealed mounting flange (1/8") 3mm thick, Type 304 stainless steel plate, (2") 50mm W x (3 1/8") 80mm H, with screw holes for concealed anchors. Cover of (3¼") 85mm diameter (12 gauge) 2.78mm stainless steel wall flanges. Grab bars to withstand downward force of 2.2N;

.1 **GB.1:** (24") 610mm long, mounted horizontally behind WC;

.1 Acceptable Products:

.1 B-5806.99x24 by Bobrick.
.2 812 Series by Bradley.
.3 Model 1001-24 by Frost.
.4 Model 3101-24P by ASI.

.2 **GB.2:** (30" x 30") 762 x 762mm L-shaped; mounted beside WC and ACS;

.1 Acceptable Products:

.1 B-716722.99-L30x30 by Bobrick.
.2 837-057 Series by Bradley.
.3 Model 1003-30x30 by Frost.
.4 Model 3104-M3030P by ASI.

.3 **GB.3:** Flip-up Grab Bars: (29") 740mm long, mounted adjacent to WCs.

.1 Acceptable Products:

.1 B-4998.99 by Bobrick.

.3 Wall-Mounted Soap Dispensers **(S):** tank is satin-finish stainless steel. Valve dispenses all-purpose hand soaps. Capacity: min. (40 fl. oz.) 1.2-L. Soap refill window. Concealed wall fastening. Hinged filler-top requires key to open. Vandal-resistant;

.1 **S.1** (surface mounted):

.1 Acceptable Products:

.1 B-2111 by Bobrick.
.2 Model 6562 by Bradley.
.3 Model 708A by Frost.
.4 Model 0347 by ASI.

.4 Coat Hooks **(CH):** Satin finish stainless steel.

.1 **CH.1**: magnetic safety release coat hooks; colours as selected by Consultant. Release Weight of (26 lbs. +/- 2 lbs.) 11.8 kg. +/- 0.9 kg.

.1 Acceptable Products:

.1 "HenkelHook" by Henkel Diversified Inc.
.2 Model 1150 by Frost.

.5 Storage Shelf **(STS)**: (18") 457mm long x (4") 100mm wide, surface mounted Type 304 stainless steel, AISI No. 4 brushed finish with (¾") 19mm return edge;

.1 Acceptable Products:

.1 MS-18, by Gamco Commercial Restroom Accessories (Div. of Bobrick).

.6 Infant Change Station **(ICS)**: high impact polyethylene, wall mounted folding change station with liner dispenser; Fill dispenser with Sanitary Bed Liners.

.1 Surface-mounted, polyethylene;

.1 Acceptable Products:

.1 Koala Care Products #KB200-00 (horizontal) by Bobrick.
.2 Model 9611 (horizontal) by Bradley.
.3 Model 1125 (horizontal) by Frost.
.4 Model 9014 (horizontal), by ASI.

.7 Adult Change Station **(ACS)**: surface-mounted, electric motorized, height-adjustable adult changing table;
.1 Table Size: (75.25") 1910mm long x (31") 798mm wide.
.2 Weight Capacity: (440 lbs.) 200 kg.
.3 Construction:
.1 Heavy-duty aluminum frame.
.2 Pneumatic counter balance.
.3 Removable durable 3-piece polyurethane foam mattress.
.4 Powder-lacquered stainless steel mounting bracket and anchors.
.4 Elect:
.1 Height adjustable from (12″) 305mm to (38 7/8″) 910mm.
.2 Operates at 24v / 1amp via 120v wall outlet.
.3 Integrated transformer and power cord.
.4 Liquid-tight actuator and control system.
.5 Chain drive; maintenance free motor; 120V AC.
.5 Safety Side Rail:
.1 Dual safety locks.
.2 Stores and locks under the table.
.3 Aluminum and polyurethane foam construction.
.6 Acceptable Products:
.1 *Pressalit Care* 3000 Adult Changing Table, by MAX-Ability.

2.5 FABRICATION

.1 Weld and grind joints of fabricated components flush and smooth. Use mechanical fasteners only where approved.

.2 Wherever possible form exposed surfaces from one sheet of stock, free of joints.

.3 Brake form sheet metal work with 1.5mm radius bends.

.4 Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.

.5 Back-paint components where contact is made with building finishes to prevent electrolysis.

.6 Hot-dip galvanize concealed ferrous metal anchors and fastening devices to CSA G164.

.7 Shop-assemble components and package complete with anchors and fittings.

.8 Deliver inserts and rough-in frames to job site at appropriate time for building-in. Provide templates, details and instructions for building in anchors and inserts.

.9 Provide steel anchor plates and components for installation on studding and building framing.

3 EXECUTION

3.1 INSTALLATION

.1 Install and secure fixtures rigidly in place as follows:
- .1 Stud walls: install steel back-plate or 2x10 solid wood blocking to stud prior to plaster or drywall finish. Provide plate with threaded studs or plugs.
- .2 Hollow masonry units: use toggle bolts drilled into cell/wall cavity.
- .3 Solid masonry: use bolt with lead expansion sleeve set into drilled hole.
- .4 Toilet/shower compartments: use male/female through bolts.

.2 Install grab bars on built-in anchors provided by bar manufacturer. Supply templates, details and instructions for building in anchors in toilet compartments. Provide through bolt fastening of grab bars in toilet compartments.

.3 Use tamperproof screws/bolts for fasteners.

.4 Install framed mirrors using concealed fasteners in locations indicated.

.5 Locate accessories where indicated on the drawings and/or as directed by the Consultant.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide site grading.

1.3 REFERENCES

.1 ASTM D698; Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft lbf/ft^3 (600 KN-m/m^3)).

1.4 DEFINITIONS

.1 Native Topsoil: existing on-site material, capable of supporting good vegetative growth and suitable for use in finish grading for sodding or seeding.

1.5 SITE CONDITIONS

.1 Underground and surface utility lines and buried objects affected by the Work, are indicated on the drawings.

.2 Locate and confirm any and all on-site services prior to commencement of grading operations.

2 PRODUCTS

2.1 MATERIALS

.1 Fill material: Types 2 and 3, in accordance with Section 31 23 00.

.2 Excavated or graded material existing on site may be suitable to use as fill for grading work if approved by Consultant, subject to laboratory analysis.

.3 Protect approved material from contamination.

3 EXECUTION

3.1 PROTECTION

.1 Protect all existing fencing, trees, landscaping, natural features, bench marks, buildings, pavement, surface or underground utility lines which are to remain, as directed by Consultant. If damaged, restore to original condition unless directed otherwise.

3.2 GRADING

.1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.

.2 Rough grade, using imported Type 2 fill material (Granular B), to the following levels below finished grade elevations:
- .1 240mm for HD asphalt paving (minimum 300mm Type 2 fill).
- .2 200mm for LD asphalt paving (minimum 200mm Type 2 fill).

.3 Rough grade, using Type 3 fill material as required, to the following levels below finished grades:
- .1 150mm for grassed areas.
- .2 600mm for planting beds.
- .3 1000mm for trees.

.4 Slope rough grade away from building 1:50 minimum.

.5 Prior to placing fill over existing ground, scarify surface to depth of 150mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.

.6 Compact filled and disturbed areas to Standard Proctor Maximum Dry Density (SPMDD) in accordance with ASTM D698 as follows:
- .1 98% under paved and walk areas, Type 2 fill.
- .2 85% under landscaped areas, Type 3 fill.

.7 Do not disturb soil within branch spread of trees or shrubs to remain.

3.3 INSPECTION & TESTING

.1 An independent testing laboratory designated by the Owner will carry out inspection and testing of soil compaction.

.2 Costs of testing will be paid from a Cash Allowance. Refer to Section 01 21 00 for allocation of allowances. Refer to Section 01 40 00 for extent and frequency of testing.

3.4 SURPLUS MATERIAL

.1 Remove surplus material and material unsuitable for fill, grading or landscaping from site.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to supply, place, and grade topsoil, and provide finish grading to site.

1.3 DEFINITIONS

.1 Native Topsoil: original topsoil stockpiled on site. Material subject to analysis by testing laboratory to ascertain suitability for use.

.2 Imported Topsoil: topsoil imported from source off-site. Characteristics of imported topsoil are specified in this section. Provision of imported topsoil shall include all costs associated with shipping and handling, placement and grading on site, as well as the addition of all soil amendments to conform to this section.

1.4 SOURCE QUALITY CONTROL

.1 Obtain Consultant's approval of Imported Topsoil source. Supplier of Imported Topsoil must submit test results performed within the last 4 months, for all topsoil to be provided to the Work, together with recommendations for soil amendments. Test results shall include the following data:

.1 Soluble salt content,
.2 Percentage of organic matter,
.3 pH value.

1.5 SUBMITTALS

.1 Product Data

.1 Submit complete Product Data for all soil amendments to be used to supplement Native and/or Imported Topsoil, as recommended by soil analysis testing.

1.6 SCHEDULING OF WORK

.1 Schedule placing of topsoil and finish grading to permit immediate sodding or seeding operations.

1.7 DELIVERY AND STORAGE

.1 Deliver and store soil amendments showing/accompanied by documentation of the weight, analysis and name of manufacture.

2 PRODUCTS

2.1 TOPSOIL MATERIALS

.1 Native Topsoil: original topsoil stockpiled on site. Material subject to analysis by testing laboratory before use.

.2 Imported Topsoil: friable, neither heavy clay nor of very light sandy nature containing minimum of 4% organic matter for clay loams and 2% for sandy loams to maximum of 25% by volume. Free from subsoil, roots, grass, weeds, toxic materials, stones, foreign objects and with an acidity range pH of 5.5 to 7.5. Topsoil containing crabgrass, couch grass or noxious weeds is not acceptable.

.3 Soil Amendments

.1 Peat Moss: decomposed plant material, fairly elastic and homogenous, free of decomposed colloidal residue, wood, sulphur and iron containing minimum 60% organic matter by weight and moisture content not exceeding 15%. Shredded particles may not exceed (1/4") 6mm in size. Minimum pH value of peat 4.5, maximum 6.0.

.2 Fertilizer: Complete commercial synthetic slow release fertilizer with maximum 35% water soluble nitrogen, formulation ratio 1:4:4.

.3 Lime:

.1 Ground agricultural limestone containing minimum 85% of total carbonates.

.2 Gradation requirements: percentage passing by weight, 90% passing 1.0mm sieve, 50% passing 125 micrometer sieve.

.3 Use lime as indicated by acidity analysis of topsoil to bring pH to required level.

.4 Bonemeal: steamed bonemeal, finely ground with a minimum analysis of 4% nitrogen and 20% phosphoric acid.

.5 Sand: hard, granular sharp sand to CSA A82.56, well washed and free of impurities, chemical or organic matter.

.6 Sulphur: finely crushed agricultural elemental sulphur, free of impurities.

3 EXECUTION

3.1 PREPARATION

.1 Grade subgrade, eliminating uneven areas and low spots, ensuring positive drainage. Remove debris, roots, branches, stones in excess of (2") 50mm diameter and other deleterious materials. Remove subsoil that has been contaminated with oil, gasoline, or calcium chloride. Dispose of removed materials as directed.

.2 Cultivate entire area which is to receive topsoil to depth of (4") 100mm. Repeat cultivation in those areas where equipment used for hauling and spreading has compacted subgrade.

3.2 SPREADING OF TOPSOIL

.1 Do not spread topsoil until Consultant has inspected and approved subgrade.

.2 Spread topsoil with adequate moisture in uniform layers during dry weather over approved, dry, unfrozen subgrade, where seeding or sodding is indicated.

.3 Keep topsoil (1") 25mm below finished grade for sodded areas; elsewhere bring topsoil up to finished grade.

.4 Apply topsoil to the following minimum depths:
- .1 (8") 200mm for seeded or sodded areas.
- .2 (18") 450mm for planting beds.
- .3 (39") 1000mm for trees.

.5 Remove stones, roots, grass, weeds, construction materials, debris and foreign non-organic objects from topsoil.

3.3 SOIL AMENDMENTS

.1 Apply soil amendments to Native Topsoil as required by soil analysis. Refer to Geotechnical Report appended to Section 00 30 00. Apply at rates recommended by amendment manufacturers.

.2 Apply soil amendments to Imported Topsoil as required by soil analysis test results, provided under this section. Apply at rates recommended by amendment manufacturers.

.3 Mix soil amendments well into full depth of topsoil as required, by cultivating or roto-tilling prior to application of fertilizer.

3.4 APPLICATION OF FERTILIZER

.1 Apply fertilizer at least one week after lime application and at least 6 days before sodding or seeding.

.2 Spread fertilizer with mechanical spreaders over entire area of topsoil at [manufacturer's recommended rate of application][rate determined on basis of soil sample test][rate as directed].

.3 Mix fertilizer thoroughly into upper (2") 50mm of topsoil.

3.5 FINISH GRADING

.1 Manually fine grade entire topsoil area to contours and elevations shown, and as directed by Consultant. Eliminate rough spots and low areas to ensure positive drainage.

.2 Roll topsoil with (100lb.) 45kg roller, minimum (3'-0") 900mm wide, to compact and retain surface.

.3 Leave surface smooth, uniform, and firm against deep foot printing, with a fine loose texture.

3.6 RESTORATION OF STOCKPILE SITES

.1 Restore stockpile sites to a "rake clean" condition, ready for application of seed or sod.

3.7 SURPLUS MATERIAL

.1 Dispose of surplus topsoil not required for fine grading and landscaping off site.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide excavating, trenching, backfill and compaction.

1.3 REFERENCE STANDARDS

.1 OPSS-1010; Material Specification for Aggregates – Granular A, B, M and Select Subgrade Material (Ontario Provincial Standard Specification).
.2 ASTM D698; Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft. lbf/ft^3 (600 kN m/m^3)).
.3 CSA-A23.1; Concrete Materials and Methods of Concrete Construction.
.4 CSA-A23.2; Methods of Test for Concrete.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Stockpiling Of Material
  .1 Stockpile fill materials in areas designated by Consultant. Stockpile granular materials in manner to prevent segregation.

  .2 Protect fill materials from contamination.

1.5 SITE CONDITIONS

.1 Location Of Existing Buried Utilities
  .1 Existing utilities and structures indicated on the drawings are schematic only. Actual size, depth, and location must be determined by site locates and test excavation.

  .2 Prior to commencing any excavation work, notify applicable authorities, and establish location and status of use of buried utilities and structures. Engage authorities having jurisdiction to clearly mark such locations to prevent disturbance during work.

  .3 Confirm locations of buried utilities by careful test excavations.

.4 Conduct, with Consultant, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, pavement, survey bench marks and monuments which may be affected by work.

1.6 SOURCE QUALITY CONTROL

.1 Inform Consultant at least 4 weeks prior to commencing work, of proposed source of fill materials and provide access for sampling.

2 PRODUCTS

2.1 FILL TYPES

.1 Fill Types are designated herein as "Type 1" etc., for clarity. Designations **do not** coincide with Soil Types defined in Section 226 of the Occupational Health & Safety Act.

.1 **Fill Type 1**: Granular A, to OPSS 1010.

.2 **Fill Type 2**: Granular B, to OPSS 1010.

.3 **Fill Type 3**: selected native material from excavation, having moisture content within 3% of optimum value, approved by the Geotechnical Engineer for use intended, unfrozen, free from roots, rocks larger than 75mm cinders, ashes, sods, refuse, or other deleterious materials.

.4 **Fill Type 4**: clean, coarse concrete sand to CSA A23.1, free from clay, shale, and organic matter.

.5 **Fill Type 5**: 20mm, clear crushed Limestone, to CSA A23.1 (rounded aggregate will not be acceptable).

3 EXECUTION

3.1 SITE PREPARATION

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

.2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

3.2 PROTECTION

.1 Existing buried utilities and structures:

.1 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.

.2 Where utility lines or structures exist in area of excavation, obtain direction of Consultant before removing or re-routing. Pay costs of such work.

.3 Record location of maintained, re-routed and abandoned underground lines.

.2 Existing Buildings and Surface Features:

.1 Protect existing buildings and surface features which may be affected by work from damage while work is in progress. In event of damage, immediately make repair to approval of Consultant.

.2 Where excavation necessitates root or branch cutting, do so only as approved by Consultant.

.3 Excavations

.1 Protect bottoms of excavations from softening or freezing.

.2 Construct banks in accordance with local bylaws.

.3 Provide adequate protection around bench markers, layout markers, survey markers, and geodetic monuments.

.4 Effect approved measures to minimize dust as result of this work.

.5 Do not stockpile excavated material to interfere with site operation or drainage.

3.3 DE-WATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while work is in progress.

.2 Submit, for Consultant's review, details of proposed dewatering or heave prevention methods, such as dikes, well points, and sheet pile cut-offs.

.3 Avoid excavation below groundwater table if quick condition or heave is likely to occur. Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.

.4 Protect open excavations against flooding and damage due to surface run-off.

.5 Dispose of water in a manner not detrimental to public and private property, or any portion of work completed or under construction.

.6 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, water courses or drainage areas.

3.4 EXCAVATION

.1 Excavate to lines, grades, elevations and dimensions indicated.

.2 Remove paving, walks, demolished foundations and rubble, and other obstructions encountered during excavation.

.3 Excavation must not interfere with normal 45 degree splay of bearing from bottom of any footing.

.4 Do not disturb soil within branch spread of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw. Seal cuts with approved tree wound dressing.

.5 For trench excavation, unless otherwise authorized by Consultant in writing, do not excavate more than 30m of trench in advance of installation operations and do not leave open more than 15m at end of day's operation.

.6 Dispose of surplus and unsuitable excavated material off site.

.7 Do not obstruct flow of surface drainage or natural watercourses.

.8 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.9 Notify Consultant when soil at bottom of excavation is reached.

.10 Obtain Consultant's approval of completed excavation.

.11 Remove unsuitable material from trench bottom to extent and depth directed by Consultant.

.12 Where required due to unauthorized over-excavation, correct as follows:
- .1 Fill under bearing surfaces and footings with concrete specified for footings.
- .2 Fill under other areas with Type 2 fill, compacted to not less than 95% Standard Proctor Maximum Dry Density (SPMDD).

.13 Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil. Clean out rock seams and fill with concrete mortar or grout to approval of Consultant.

.14 Excavation exceeding that indicated in contract documents, if authorized in writing by Consultant before extra excavation is performed, will be paid as extra to Contract price in accordance with General Conditions.

3.5 FILL TYPES AND COMPACTION

.1 Exterior Side of Foundation Walls: Type 2 fill to subgrade level. Compact to 95% SPMDD in accordance with ASTM D698. Use Type 3 fill where approved by Testing and Inspection Authority.

.2 Sub-Base Courses
- .1 For Concrete Slabs-On-Grade
  - .1 Interior Floor Slabs: Type 2 to underside of base course for floor slabs. Compact to 98% SPMDD in accordance with ASTM D698.

.3 Base Courses
- .1 Concrete Slabs-On-Grade
  - .1 Interior Floor Slabs: 200mm Type 1 fill. Compact to 98% SPMDD.

.4 Underground Services:
- .1 Refer to Civil Engineering Drawings for excavating trenching and backfill of site services.

3.6 BACKFILL

.1 Do not proceed with backfill operations until Consultant has inspected and approved installations.

.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow or debris.

.4 Prior to placing fill under slabs on grade, compact existing subgrade to obtain same compaction as specified for fill. Remove "soft" material and fill with approved material.

.5 Prior to installation of foundations, compact existing subgrade to obtain required bearing capacity. Remove "soft" material and fill footing concrete.

.6 Place backfill material in uniform layers not exceeding 152mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.7 Backfill around services:

.1 Refer to Civil Engineering Drawings for excavating trenching and backfill of site services.

3.7 INSPECTION AND TESTING

.1 Testing of materials and compaction will be carried out by testing laboratory designated by the Owner. Refer to Section 01 40 00.

.2 Cost of tests will be paid from a Cash Allowance. Refer to Section 01 21 00.

.3 Frequency of Tests

.1 Excavated surfaces: when undisturbed excavated surface is being prepared, make a series of 3 tests of surface for each 500m^2 area.

.2 Fill under floor or other slabs on grade: make 3 tests for every 2 lifts of compacted fill for each 500m^2 area.

.3 Backfill structural walls: test each different material for approximately each 50m of wall being backfilled, at depth increments of 600mm.

.4 If, during progress of work, tests indicate fills do not meet specified requirements, remove defective fills, replace and retest at no extra cost.

3.8 RESTORATION

.1 Upon completion of work, remove surplus materials and debris from site, and correct defects as directed by Consultant.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide asphalt concrete pavement structures, including:
- .1 Proof rolling of sub-base for compaction required,
- .2 Placement, fine grading and final compaction of granular base material,
- .3 Placement, compaction, and finishing of asphaltic concrete.

.2 The work of this section shall include the removal of existing asphalt paving and granular base, where scheduled on the drawings, grinding and recycling of asphalt material, and re-surfacing with recycled and new asphalt. Re-surfacing shall include new Granular A Base material where required to replace soft base material, or to adjust grading to suit drainage pattern. Sections of paving may be ground and resurfaced only. Refer to the drawings for locations of these areas.

1.3 REFERENCE STANDARDS

.1 OPSS-1010; Material Specification for Aggregates – Granular A, B, M and Select Subgrade Material (Ontario Provincial Standard Specification).
.2 OPSS 1103; Material Specification for Emulsified Asphalt (Ontario Provincial Standard Specification).
.3 OPSS-1150; Material Specification for Hot Mix, Hot Laid Asphaltic Concrete (Ontario Provincial Standard Specification).
.4 OPSS-1154; Material Specifications for Hot Mixed, Hot Laid, Asphaltic Concrete Containing Reclaimed Asphalt Pavement (Ontario Provincial Standard Specification).
.5 ASTM D698; Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft. lbf/ft^3 (600 kN m/m^3)).
.6 ASTM D979; Practice for Sampling Bituminous Paving Mixtures.
.7 ASTM D995; Specification for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.

1.4 PAVEMENT DESIGN

.1 The following pavement designs are required. Thicknesses referenced are "after compaction". Refer to drawings for location and extent of paving types:
- .1 Heavy Duty Asphalt
  - .1 Base Course: (6")150mm, Granular A fill.
  - .2 Binder Course: (2") 50mm HL-8,
  - .3 Surface Course: (1.6") 40mm HL-3.

.2 Light Duty Asphalt
  .1 Base Course: (6") 150mm, Granular A fill.
  .2 Surface Course: (2") 50mm HL-3.

1.5 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:
  .1 Contractor (Site Superintendent & Project Manager)
  .2 Application Subcontractor (Site Foreman & Project Manager)
  .3 Product Manufacturer and/or Distributor (Technical Representatives)
  .4 Related Subcontractors whose work is affected by that of this Section.

2 PRODUCTS

2.1 MATERIALS

.1 Base Materials

.1 Type 1 fill: OPSS 1010.05; Granular "A" to Section 31 23 00.

.2 Type 2 fill: OPSS 1010.05; Granular "B" to Section 31 23 00.

.2 Asphalt Prime: MTO Primer, or SS-1 to OPSS 1103.05.

.3 Sand Blotter: clean concrete sand, passing (3/16") 4.75mm sieve and free from organic matter or other deleterious materials.

.4 Asphaltic Concrete: hot mix, hot laid asphaltic concrete, to OPSS 1150.05.
  .1 Binder Course: HL-8.
  .2 Surface Course: HL-3.

2.2 PLANT AND MIXING REQUIREMENTS

.1 To ASTM D995, and OPSS 1150.

2.3 EQUIPMENT

.1 Grinders: mechanical, self-powered pavement grinding and re-cycling units.

.2 Pavers: mechanical, grade-controlled, self-powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.

.3 Rollers: sufficient number of rollers of type and weight to obtain specified density of compacted mix.

.4 Vibratory Rollers
.1 Minimum drum diameter: (2'-6") 750mm.

.2 Maximum amplitude of vibration machine setting: (0.02") 0.5mm for lifts less than (1½") 40mm thick.

.5 Haul trucks
.1 Adequate size, speed and condition to ensure orderly and continuous operation, and as follows:
.1 Boxes with tight metal bottoms.
.2 Covers of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.
.3 In cool weather or for long hauls, insulate entire contact area of truck.

.6 Suitable hand tools.

2.4 SOURCE QUALITY CONTROL
.1 Submit mix designs from asphalt supplier for review by Consultant prior to mobilization for asphalt pavement work.

3 EXECUTION

3.1 PREPARATION
.1 Verify grades of subgrade drains, maintenance holes, catch basins, and other items set in paving area for conformity with elevations and sections before placing granular base materials.

.2 Where placement of granular base does not immediately follow sub-base, or where sub-base has suffered severe weather conditions, proof roll sub-base by numerous passes of compaction equipment to ensure that a uniform 98% Standard Proctor Maximum Dry Density (SPMDD) is achieved.

.3 Obtain approval of sub-base by Consultant before placing granular base.

.4 Place granular base material on clean unfrozen surface, properly shaped and compacted and free from snow and ice.

3.2 BASE & SUBBASE COURSES
.1 SubBase Courses
.1 Heavy Duty Pavement: (12") 300mm compacted thickness of Granular B fill.
.2 Light Duty Pavement: (8") 200mm compacted thickness of Granular B fill.

.2 Base Courses
.1 Heavy Duty Pavement: (6")150mm compacted thickness of Granular A fill.
.2 Light Duty Pavement: (6") 150mm compacted thickness of Granular A fill.

.3 Grade to uniform levels or slopes between given elevations or between given elevations and existing surfaces, allowing for depth of asphalt surfacing.

.4 Place base course in lifts not exceeding (6") 150mm compacted thickness for new asphalt paving areas. Compact to 100% SPMDD in accordance with ASTM D698.

3.3 ASPHALT PRIME

.1 Do not apply prime when air temperature is less than (41°F) 5°C or when rain is forecast within 2 hours.

.2 If asphalt prime fails to set within 24 hours, spread sand blotter material in amounts required to absorb excess material. Sweep and remove excess blotter material.

3.4 ASPHALT CONCRETE PAVING

.1 Pavement Thickness

.1 Heavy Duty Paving

.1 Binder Course: (2") 50mm HL-8, after compaction.

.2 Surface Course: (1.6") 40mm HL-3 after compaction.

.2 Light Duty Paving

.1 Surface Course: (2.0") 50mm HL-3, after compaction.

.2 Obtain approval of base and primer from Consultant before placing asphalt mix.

.3 Place asphalt mix only when base or previous course is dry and air temperature is above (41°F) 5°C.

.4 Paint contact edges of catch basins, and maintenance holes with hot asphalt prime before the mixture is placed against them.

.5 Apply hot asphalt prime to existing asphalt when repaving, or over binder course applied more than 7 days before surface course application. Power wash surface prior to applying prime, to remove any and all dirt, or other surface contamination. Allow to dry sufficiently.

.6 Binder courses applied less than 7 days prior to surface course application shall be power-washed to remove any and all dirt, or other surface contamination, and allowed to dry sufficiently. Power washing may be done in lieu of applying prime, to the approval of the Consultant.

.7 Place asphalt concrete in compacted layers not exceeding (2") 50mm.

.8 Minimum (275°F) 135°C mix temperature required when spreading.

.9 Maximum (320°F) 160°C mix temperature permitted at any time.

.10 Compact each course with roller as soon as it can support roller weight without undue cracking or displacement.

.11 Compact asphalt concrete to density not less than 95% of density obtained with Marshall specimens prepared in accordance with ASTM D1559 from samples of mix being used.

.12 Roll until roller marks are eliminated. Keep roller speed slow enough to avoid mix displacement and do not stop roller on fresh pavement.

.13 Moisten roller wheels with water to prevent mix adhesion.

.14 Compact mix with hot tampers, or other equipment approved by Consultant, in areas inaccessible to roller.

.15 Finish surface smooth, of uniform density and texture, true to grade to within (3/8") 10mm and with no irregularities greater than (3/8" in 14.75') 10mm in 4.5m.

.16 Repair areas showing checking, rippling or segregation as directed by Consultant.

3.5 JOINTS

.1 Remove surplus material from surface of previously laid strip. Do not deposit on surface of freshly laid strip.

.2 Paint contact surfaces of existing structures such as manholes, curbs or gutters with bituminous material prior to placing adjacent pavement.

.3 For cold joints, cut back to full depth vertical face and tack face with hot asphalt.

.4 For longitudinal joints, overlap previously laid strip with spreader by (1" to 2") 25 to 50mm.

3.6 PROTECTION

.1 Keep vehicular traffic off newly paved areas until paving surface temperature has cooled below (100°F) 38°C. Do not permit stationary loads on pavement until 24 hours after placement.

.2 Provide access to buildings as required. Arrange paving schedule so as not to interfere with normal use of premises.

3.7 FIELD QUALITY CONTROL

.1 The work of this section may be subject to inspection and testing as specified in Section 01 40 00. Allow for independent inspection by an Independent Testing Authority. Costs for inspection and testing will be paid from a cash allowance, as allocated in Section 01 21 00.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to Provide sodding.

1.3 DELIVERY, STORAGE & HANDLING

.1 Deliver and store sod on wood pallets.

.2 Deliver sod to site within 24 hours of being lifted and lay sod within 36 hours of being lifted.

.3 Do not deliver small, irregular or broken pieces of sod.

.4 During wet weather, allow sod to dry sufficiently to prevent tearing during lifting and handling.

.5 During dry weather protect sod from drying, and water sod as necessary to ensure its vitality and prevent dropping of soil in handling. Dry sod will be rejected.

1.4 SCHEDULING

.1 Schedule sod laying to coincide with topsoil and finish grading operations.

2 PRODUCTS

2.1 Materials

.1 Nursery Sod: quality and source to comply with standards outlined in Section 17 of the Guide Specification for Nursery Stock (latest edition), published by Canadian Nursery Trades Association.

.1 Number One Kentucky Bluegrass Sod: grown from minimum mixture of 3 Kentucky Bluegrass cultivars.

.2 Water: potable.

.3 Fertilizer: complete, synthetic, slow release fertilizer, with maximum 35% water-soluble nitrogen.

2.2 SOURCE QUALITY CONTROL

.1 Obtain approval of sod source from Consultant. Once approved, use no other source without written authorization.

3 EXECUTION

3.1 PREPARATION

.1 Verify that grades are correct and prepared in accordance with Section 31 22 19. If discrepancies occur, notify Consultant immediately and do not commence work until instructed by Consultant to do so.

.2 Do not perform work under adverse field conditions such as frozen, excessively wet or dry soil, or soil covered with snow, ice or standing water.

.3 Fine grade surface free of any remaining humps and hollows to smooth even grade, to tolerance of ± (3/8") 10mm.

.4 Remove and dispose of any visible weeds, debris, stones, and contaminated soil.

.5 Clean up immediately soil or debris spilled onto adjacent pavement and dispose of deleterious materials.

3.2 LAYING OF SOD

.1 Prior to sodding, obtain approval from Consultant that finished grade and depth of topsoil are satisfactory.

.2 Sodding during excessively wet conditions, at freezing temperatures or over frozen soil is not acceptable.

.3 Lay sod in rows, perpendicular to slopes, smooth and even with adjoining areas, and with joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.

.4 Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

.5 Water sod immediately after laying to obtain moisture penetration into top (4") 100mm of topsoil.

3.3 MAINTENANCE

.1 Maintain sodded area from time of installation until final acceptance of sod, subject to the conditions specified below.

.2 Water sodded areas in sufficient quantities and at frequency required to maintain soil under sod continuously moist for depth of (3" to 4") 75 to 100mm.

.3 Cut grass to (1½") 40mm when it reaches height of (2½") 65mm. Remove clippings which will smother grassed areas.

.4 Maintain sodded areas weed-free.

.5 Fertilize sodded areas one month after sodding with 2:1:1 ratio fertilizer. Spread evenly at recommended rate and water in well.

3.4 FINAL ACCEPTANCE

.1 Sodded areas will be accepted at final inspection provided that:

.1 Sodded areas are properly established and indicated growth.

.2 Sod is free of bare and dead spots and without weeds.

.3 No surface soil is visible when grass has been cut to specified height.

.4 Sodded areas have been cut at least once.

.2 Lawns sodded in fall will be eligible for acceptance one month after start of growing season in following spring, provided all acceptance conditions are fulfilled.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide foundation drainage system
- .1 Flexible plastic tubing.
- .2 Rigid plastic piping and fittings.

1.3 REFERENCE STANDARDS

.1 ASTM D698; Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft. lbf/ft^3 (600 kN m/m^3)).
.2 ASTM D3212; specification for joints for drain and sewer plastic pipes using flexible elastomeric seals.
.3 CSA A23.1; Concrete Materials and Methods of Concrete Construction.
.4 CSA B182.1; Plastic Drain and Sewer Pipe and Pipe Fittings.
.5 CSA B182.8; Profile Polyethylene Storm Water Pipe and Fittings.
.6 OPSS-1010; Material Specification for Aggregates – Granular A, B, M and Select Subgrade Material (Ontario Provincial Standard Specification).

1.4 SUBMITTALS

.1 Samples
- .1 Submit samples of foundation drainage Products, for review by Consultant, in accordance with Section 01 30 00.

.2 Product Data
- .1 Submit Product data for foundation drainage material, for review by Consultant, in accordance with Section 01 30 00.

.3 Test Reports
- .1 Submit copies of all test results, indicating performance characteristics, and compliance with referenced standards.

1.5 QUALITY ASSURANCE

.1 Manufacturer/Fabricator
- .1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in

accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:

.1 Contractor (Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.6 SITE CONDITIONS

.1 Known underground utility lines and buried objects are indicated on drawings.

2 PRODUCTS

2.1 BEDDING, DRAINAGE, HAUNCHING & BACKFILL MATERIALS

.1 Bedding Material: fine aggregate to CSA A23.1, Table 4, FA1, concrete sand; free from clay lumps, cementation, and organic, frozen or other deleterious materials. Gradations within limits specified when tested to CSA-A23.2A.

.2 Drainage Material (Tubing): to CSA A23.1, coarse filter aggregate; Table 5, Group I, (3/4-3/16") 20-5mm; clear crushed stone.

.3 Haunching & Backfill Material: to OPSS 1010, Granular B fill.

2.2 PIPE & TUBING MATERIALS

.1 Flexible Plastic Drainage Tubing: to CSA B182.6, perforated, single wall corrugated, High Density Polyethylene (HDPE), nominal inside diameter (4") 100mm;

.1 Flow Rate: (131 gal/min) 10L/s.
.2 Compressive Strength: (30 lb/in^2) 210 kPa.
.3 Join System: Type 3 – Soil tight.
.4 Tubing Wrap: one-piece knitted polyester filter sock.
.5 Acceptable Products

.1 BIG-O® Drainage Tubing, by Armtec Construction Products, Guelph ON.

.2 Rigid Plastic Pipe & Fittings: to CSA B182.1, non-perforated, dual-wall construction, (6") 150mm nominal inside diameter, complete with fittings.

.1 Type of joining system; Type 1 – watertight to ASTM D3212.
.2 Acceptable Products

.1 BOSS® HDPE Piping, by Armtec Construction Products, Guelph ON.

.3 Foundation Drainage Layer: to Section 33 46 23.

.4 Geotextile Filter Medium: Non-woven, polypropylene geosynthetic;

.1 Non-Woven Geotextile 250, by Armtec Construction Products, Guelph ON.

.2 Terrafix® 270R by Terrafix Geosynthetics Inc., Rexdale ON.
.3 Typar 3301, by Fiberweb Inc.
.4 Nilex 4546, by Nilex Inc. (Canada), Vaughan ON.
.5 Mirafi® N-Series, by TC Mirafi, Pendergrass GA.

3 EXECUTION

3.1 INSPECTION

.1 Ensure graded subgrade conforms with required drainage pattern before placing bedding material.

.2 Ensure improper slopes, unstable areas, areas requiring additional compaction or other unsatisfactory conditions are corrected to approval of Consultant.

.3 Ensure foundation wall and dampproofing / waterproofing and drainage layer have been installed and approved by Consultant before placing bedding material.

3.2 BEDDING PREPARATION

.1 Cut trenches and place bedding in uniform lifts not exceeding (6") 150mm compacted thickness, to depth required to achieve uniform slope around perimeter of building.

.2 Shape bed true to grade and to provide continuous, uniform bearing surface for tubing.

.3 Shape transverse depressions, as required, to suit joints.

.4 Compact each lift to at least 95% of Standard Proctor Maximum Dry Density (SPMDD) to ASTM D698.

.5 Fill excavation below design elevation of bottom of specified bedding with compacted bedding material.

3.3 PERFORATED TUBING INSTALLATION

.1 Ensure tubing interior and coupling surfaces are clean before laying.

.2 Lay perforated tubing level around base of foundation footings. Make joints soil tight.

.3 Grade bedding to establish slope.

.4 Install end plugs at ends of collector tubing to protect ends from damage and ingress of foreign material.

.5 Place clear stone drainage material in uniform lifts not exceeding (6") 150mm, and hand tamp to achieve minimum (6") 150mm cover over top of pipe.

.6 Place layers uniformly and simultaneously on each side of tubing to avoid shifting, or crushing.

.7 Place geotextile filter medium continuously over drainage material prior to backfilling. Tape edge against foundation to filter medium on foundation drainage layer.

3.4 NON-PERFORATED PIPE INSTALLATION

.1 Ensure tubing and piping interior and coupling surfaces are clean before laying.

.2 Lay perforated tubing level around base of foundation footings. Make joints soil tight.

.3 Lay non-perforated pipe to slope of minimum 1:50 from perforated tubing to disposal source. Make joints watertight.

.4 Grade bedding to establish pipe slope.

.5 Provide cleanouts on non-perforated pipe at all changes of building direction and in runs greater than (49ft) 15m.

.6 Provide flush cleanouts where directed by Consultant.

.7 Connect non-perforated pipe to storm sewer or sump pit as indicated on the drawings, by appropriate adapters manufactured for this purpose.

.8 Place haunching material in uniform compacted lifts of (6") 150mm, up to the springline of the pipe.

.9 Place layers uniformly and simultaneously on each side of piping to avoid shifting, or crushing.

.10 Flush test entire system with clean water, prior to commencing backfill operations. Check for leaks, blockages, low spots in tubing, or other defects. Repair or adjust as necessary before covering.

3.5 BACKFILL MATERIAL

.1 Place backfill material over drainage and haunching materials in uniform layers not exceeding (6") 150mm compacted thickness to levels as indicated, and as specified in Section 31 23 00.

.2 Exterior side of perimeter walls: compact backfill to minimum 90% of SPMDD to ASTM D698.

.3 Under paving and walks, compact backfill to minimum 95% of SPMDD to ASTM D698.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to Provide the below grade drainage composite sheet.

1.3 REFERENCE STANDARDS

.1 AATC 127; Water Resistance: Hydrostatic Pressure Test.
.2 ASTM C1311; Standard Specification for Solvent Release Sealants.
.3 ASTM D1621; Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
.4 ASTM D3776; Standard Test Methods for Mass Per Unit Area (Weight) of Fabric.
.5 ASTM D3786; Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method.
.6 ASTM D4355; Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus.
.7 ASTM D4491; Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
.8 ASTM D4533; Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
.9 ASTM D4632; Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
.10 ASTM D4716; Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
.11 ASTM D4751; Standard Test Method for Determining Apparent Opening Size of a Geotextile.
.12 ASTM D4833; Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
.13 ASTM E96/E 96M; Standard Test Methods for Water Vapor Transmission of Materials.
.14 CCMC Technical Guide for Foundation Wall Drainage Systems – Dimpled Membranes.
.15 CGSB 19-GP-14M; Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.

1.4 SUBMITTALS

.1 Samples

.1 Submit (12" x 12") 300mm x 300mm samples of drainage layer material, and eacxh type of fastener, for review by Consultant, in accordance with Section 01 30 00.

.2 Product Data

.1 Submit Product data for drainage layer material, for review by Consultant, in accordance with Section 01 30 00. Include:

.1 Preparation instructions and recommendations.
.2 Storage and handling requirements and recommendations.
.3 Installation methods.
.4 Specimen warranty.

.3 Test Reports

.1 Submit copies of all test results, indicating performance characteristics, and compliance with referenced standards.

1.5 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:

.1 Contractor (Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver all Products to the project site in original and unopened packages with the manufacturer's labels intact.

.2 Materials shall be stored on site in such a manner so as to protect them from precipitation. Raised platforms and waterproof coverings shall be used where necessary. Dirt shall not be permitted to enter the drainage layer "core" prior to installation. Protect roll ends on site as required.

.3 On direction from the Consultant, the performance of the drainage layer installation may be evaluated prior to backfilling through flood test procedures independent of the manufacturer.

.4 Pallets of drainage layer shall not be double stacked.

1.7 JOB CONDITIONS

.1 The drainage layer and accessory materials shall be applied at ambient temperatures satisfactory to the manufacturer and under dry conditions only.

.2 The drainage layer as specified herein and its installation shall conform to and proceed in accordance with any and all codes, standards and practices governing work of the nature described throughout this specification.

1.8 WARRANTY

.1 Submit a manufacturer's standard warranty certificate, in the name of the Owner, warranting the Products specified herein, and as Provided, against material or manufacturing defect for a period of five (5) years from Date of Substantial Performance.

2 PRODUCTS

2.1 MATERIALS

.1 Drainage Composite for Vertical Applications: Prefabricated composite drainage sheet comprised of a (28mil) 0.7mm high-impact thermoformed polystyrene core, dimpled on one face maintaining a minimum profile of minimum (5/16") 8mm; integrally bonded to a (4oz/yd^2) 138g/m^2 non-woven polypropylene geotextile on one face. Drainage layer shall be provided in rolls of (48" x 50'-0") 1.2m x 15.2m with a minimum (3") 75mm fabric selvedge running continuously along one side of the roll;

- .1 Compressive Strength: (5,200 psf) 250 kN/m².
- .2 Flow rate (Horizontal Orientation): 1.4 gal/min/ft (17.4 l/min/m) to ASTM D4716.
- .3 Flow rate (Vertical Orientation): 5.2 gal/min/ft (65 l/min/m) to ASTM D4716.
- .4 Temperature Range: (-22°F to +176°F) -30°C to +80°C.
- .5 Recycled Content: 60% post consumer / post-industrial HDPE.
- .6 Acceptable Products
  - .1 Delta®-Drain, by Cosella-Dorken Products Inc., Beamsville ON.
  - .2 Hydroduct 220®, by Grace Canada Inc., Ajax, ON.
  - .3 TREMDrain 1000, by Tremco Commercial Sealants & Waterproofing, Toronto ON.
  - .4 Terradrain® 620, by Terrafix Geosynthetics Inc., Rexdale ON.

.2 Tape: self adhering, pressure sensitive tape comprised of hot melt adhesive on a paper reinforcing provided in rolls of dimension (1" in 200ft) 25mm x 61m.

.3 Fasteners: non-puncturing attachments for installing drainage sheet over waterproofing membranes.

.4 Termination Bar: manufacturer's standard top edge termination bar.

.5 Mastic: single component, utility grade, rubber-based mastic.

3 EXECUTION

3.1 GENERAL

.1 Examine all areas to receive drainage layer to ensure that they are suitably prepared for its installation.

.2 Surfaces shall be dry and free of dirt and debris that would otherwise hinder either adhesion or regularity of drainage layer installation.

.3 Ensure compatibility of drainage layer with existing soil and ground water conditions.

.4 Drainage layer and accessory materials shall be installed only in suitable weather and where ambient air temperatures are appropriate for securement method.

3.2 INSPECTION AND REPAIR

.1 Inspect all surfaces to receive drainage layer to ensure that they are suitably prepared for its installation. Have deficiencies addressed prior to commencement of the installation.

3.3 INSTALLATION

.1 Commence installation of drainage layer at base of wall. Position drainage layer alongside wall such that bottom edge coincides with point just behind foundation drainage tubing.

.2 Peel back filter fabric along lower edge approximately (12") 305mm and wrapped around the outside of the discharge pipe.

.3 Attach drainage layer to wall using tape run continuously along top and bottom of each panel, or using non-puncturing self-adhering stick fasteners. Apply sufficient pressure to ensure secure attachment to wall.

.4 Butt subsequent sheets of drainage layer tightly against edge of previously installed sheet. Overlap seams with fabric, taped or otherwise made continuous, to ensure dirt will not enter drainage core upon backfilling.

.5 At inside corner locations, cut drainage core from backside of layer while leaving fabric intact. At outside corners, cut through drainage layer and cover cut ends with fabric or construction grade tape.

.6 Apply drainage layer to a point no higher than (4") 100mm below finished grade elevation. The top termination shall be sealed to prevent soil from entering the drainage core by wrapping the (3") 75mm fabric selvedge over the exposed core, or with termination bar. Adhere to the wall at this location using tape or mastic.

END OF SECTION

Part E – Drawings

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C-101 Grading/Servicing Plan

C-102 Details

Architectural Drawings

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A0.2 Drawing Annotations

A0.3 General Notes

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A1.1 OBC Matrix

A2.0 Ground Floor Plan

A2.2 Fixtures Plan

A2.3 Roof Plan

A3.0 Building Elevations

A3.1 Building Elevations

A3.2 Building Elevations

A5.0 Building Sections

A6.0 Interior Elevations

A7.0 Reflected Ceiling Plan

A8.0 Section Details

A8.1 Section Details

A8.2 Accessibility Details

A9.0 Schedules

A9.1 Door Schedule

Structural Drawings

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S0.2 General Requirements and Specifications

S0.3 General Requirements and Specifications

S0.4 General Requirements and Specifications

S0.5 General Requirements and Specifications

S0.6 General Requirements and Specifications

S0.7 General Requirements and Specifications

S0.8 Typical Details

S0.9 Typical Details

S0.10 Typical Details

S0.11 Typical Details

S0.12 Typical Details

S1.0 Foundation Notes

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S2.0 Roof Framing Notes

S2.1 Roof Framing Plan

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Mechanical Drawings

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M2 HVAC Layout

M3 Plumbing Layout

M4 Mechanical Specifications

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Electrical Drawings

E1-1 Electrical Details, Notes and Legend

E1-2 Electrical Details, Notes and Legend

E1-3 Electrical Details, Notes and Legend

E2 Lighting Layout and Schedule

E3 Electrical Power Layout

E4 Power Distribution And Panel Schedule

E5 Electrical Specification