
Gypsum Board

.5 Exterior sheathing board:

- .1 Service grade: Exterior grade.
- .2 Exposure to weather: Comply with manufacturer's printed instructions. Provide protection prior to exposure for periods greater than manufacturer's recommendations and warranty.
- .3 Fibreglass mat faced on front and back sides and long edges, silicone-treated water-resistant core, to ASTM C1177/C1177M-06, fire rated where indicated.
 - .1 Acceptable *Products*:
 - .1 CertainTeed 'GlasRoc Sheathing'.
 - .2 CGC 'Securock Glass-Mat Sheathing'.
 - .3 Georgia-Pacific 'Dens-Glass Gold'.

2.2 Fasteners

- .1 Screws; for gypsum board: bugle head, fine thread, self-tapping, Type W or S or S-12 point to suit framing type and metal gauge, with corrosion resistant finish to ASTM C1002-04/ASTM C954-07. Screw sizing:
 - .1 #6 x 25 mm (1") for single thickness board fastening.
 - .2 #6 x 32 mm (1-1/4") for single thickness 15.9 mm (5/8") board fastening.
 - .3 #7 x 41 mm (1 5/8") for double thickness board fastening.
- .2 Tie wire: 1.6 mm (0.063") diameter galvanized soft annealed steel wire.

2.3 Accessories

- .1 Accessories: to ASTM C1047-09 unless otherwise indicated, maximum length pieces per location. Flanges shall be free from dirt, grease, or other material that adversely affects the bond of joint treatment or decoration.
- .2 Casing trim; "L" or "LC" beads: Bailey D200 and 4411, Nicholson Rollforming Metal Trim 200-A and 200-B fillable edge trim, 0.55 mm (0.022") base thickness commercial grade sheet steel with zinc wiped coating to ASTM A924/A924M-09; perforated flanges.
- .3 Corner bead: Bailey D100, Nicholson Rollforming No. 114, fillable edge trim, 0.55 mm (0.022") base thickness commercial grade sheet steel with zinc wiped coating to ASTM A924/A924M-09; perforated flanges.
- .4 Reveal trim at junctions to exposed masonry and concrete: Gordon Series 300, 312-5/8, or matching style by Fry Reglet.
- .5 Reveal trim; at acoustic tile to gypsum board transitions:
 - .1 Fry Reglet 'Drywall/Acoustical Reveal DRMAD-50-50, or matching style by Gordon Interior Specialties.
- .6 Control joints:
 - .1 No. 093 Zinc Control Joint by CGC Inc. or approved alternate, certified by manufacturer for use at fire resistance rated assemblies.
 - .2 Fry Reglet DRM-50-25 2-PC, or matching style by Gordon Interior Specialties.
 - .3 093V Expansion Bead by Trim-Tex Drywall Products Inc.

Gypsum Board

- .7 Vinyl casing beads; at gypsum board interface with aluminum framed glazing: Vinyl type j-moulds.
- .8 Vinyl cove moulding: Trim-Tex 38 mm (1-1/2") inside radius corner trim including 3 way inside corner trim and termination trim.
- .9 Aluminum gypsum board trim: extruded alloy 6063-T5 to ANSI H35.1-09 consisting of fin, tapered, grooved, and prepunched for screw attachment and bonding agent, as manufactured by Gordon, Inc., or Softforms or Fry Reglet.
- .10 Provide 100 mm (4") bullnose inside and outside corners by Fry Reglet as indicated on drawings.

2.4 Related Support Assemblies and Backer Plates

- .1 Wind bearing metal studs at wind bearing exterior assemblies: in accordance with Section 05400.
- .2 Dimensional wood blocking at interior assemblies: in accordance with Section 06100.
- .3 Metal support systems and backer plates at interior assemblies: in accordance with Section 09100.

2.5 Joint and Adhesive Materials

- .1 Joint compound:
 - .1 Gypsum board work: asbestos-free. Latex resin base, possessing good adhesion, mixed with fresh, unadulterated water having no detrimental effect on compounds, to ASTM C475/C475M-02(2007); type recommended by manufacturer for application indicated.
 - .2 Gypsum board to receive tile finish: setting-type powder based joint finishing compound. 'Durabond' by CGC or approved alternate.
- .2 Joint reinforcing tape:
 - .1 Gypsum board: 50 mm x 0.3 mm (2" x 0.01") thick, perforated paper, with chamfered edges.

2.6 Acoustic Wall Assembly and Noise Barrier Ceiling Materials

- .1 Acoustic sealant; concealed locations: non-skinning acoustic sealant, non-hardening type to CGSB 19.21-M87, acceptable products:
 - .1 Tremco 'Acoustical Sealant'.
 - .2 Substitutions: in accordance with Section 01250.
- .2 Acoustic sealant; exposed locations: Interior paintable sealant in accordance with Section 07900.
- .3 Acoustic sealant for plenum locations: Smoke-seal sealant with flame-spread not more than 25 and smoke developed classification not more than 50 to CAN/ULC-S102-03, in accordance with Section 07840.
- .4 Acoustic compound: premixed perlite plaster.
- .5 Acoustic (sound attenuation) insulation:

Gypsum Board

- .1 Mineral-fibre sound attenuation batts: to CAN/ULC S702-97, Type 1, and to CAN/ULC-S114-05.

- .1 Acceptable *Products*:

- .1 CertainTeed 'Fibre Glass Building Insulation'.
 - .2 Fibrex 'Sound Attenuation Fire Batt (SAFB)'
 - .3 Johns Manville 'Sound-SHIELD'
 - .4 Roxul 'AFB'.
 - .5 Owens-Corning 'QuietZone'.

- .6 Refer to Section 09844 for spray acoustic insulation.

2.7 Access Doors

- .1 Access doors: in accordance with Division 15 and Division 16.

PART 3 - EXECUTION

3.1 Installation

- .1 General: Comply with ASTM C840-08, GA 216-07, GA 600-06, and manufacturer's instructions, except as otherwise indicated. Do not bridge building expansion joints with support system. Frame both sides of joints with furring and other supports as indicated.
- .2 Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1.6 mm (1/16") open space between boards. Do not force into place.
- .3 Cover both faces of stud partition framing with gypsum board in concealed spaces (above ceiling, and the like) unless otherwise indicated, except in chase walls which are properly braced internally.
- .4 Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cut-outs.
- .5 Securely attach trim, casings, framing, and accessories.
- .6 Apply components of fire-rated assemblies in conformance with indicated designs.
- .7 Erect materials to dimensions indicated, plumb, level, straight, and square to adjoining elements.
- .8 Do not apply gypsum board in close proximity to hot pipes or heating ducts.
- .9 Install materials with the minimum number of joints. Tightly butt joints, without force, and neatly align them.
- .10 Frame openings on every side. Provide clearances with services.
- .11 Work shall include bulkheads over doors, frames, screens, and changes in ceiling levels, pipe space and as indicated.
- .12 Provide clearances between work of this section and structural elements to prevent transference of structural loads in accordance with Section 09100.
- .13 Tolerances:

Gypsum Board

- .1 Do not exceed 3 mm (1/8") in 3 m (10') variation from plumb, level, and plane in exposed surfaces, except at end joint between gypsum board panels.
- .2 Do not exceed 10 mm (3/8") from indicated location.
- .3 Do not exceed 1.5 mm (1/16") variation between planes of abutting edges or ends.
- .4 Surface flatness shall not exceed 1.5 mm (1/16") within 305 mm (12") straight edge. For non-tapered-edge end joints between boards, measure flatness tolerance with end of straight end at centreline of joint.

3.2 Accessories

- .1 At external corners install corner trim secured to framing at 230 mm (9-1/16") on centre on both flanges with screw fasteners or clinch tool.
- .2 Secure casing trim at board edges where exposed to view, where board butts against other materials with no trim to conceal junction, at perimeter of ceiling surfaces at tops of partitions where they stop against continuous ceiling surfaces, and where indicated.
- .3 Erect accessories straight, plumb or level, rigid and at proper plane.
- .4 Use full length pieces.
- .5 Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners, free from rough edges. Secure in accordance with manufacturer's specifications unless otherwise required.
- .6 Installation tolerances:
 - .1 Alignment with board panels shall not exceed tolerances specified above.
 - .2 End joints shall be flush aligned to maximum offset of 0.5 mm (0.020").

3.3 Board Application - General

- .1 Before application of gypsum board commences, ensure that internal services have been installed, tested, and approved; that conduits, pipes, cables, and outlets are plugged, capped, or covered; and that fastenings and supports installed by others are in place.
- .2 Extend board into door, window, and other openings, reveals, behind fittings, and other applied items and on metal stud partitions to structure above unless indicated otherwise.
- .3 Apply board with long dimension perpendicular to supports, unless otherwise indicated.
- .4 Locate joints on opposite sides of partitions on different studs, and at least 305 mm (12") from opening jambs.
- .5 Install board to minimize joints, and align end joints to be the least objectionable (where they are unavoidable), according to the indicated lighting design. Locate joints in ceilings where least prominently discerned, and never line them up with opening edges.
- .6 Form smooth joints at ends and at field cut edges of board panels.
- .7 Fasten board to metal support members by metal gypsum board screws, 9.5 mm (0.374") minimum to, and 12.7 mm (1/2") maximum from, center of joints. Space screws:
 - .1 At fire rated board as per fire-rated assembly.

Gypsum Board

- .2 At typical board walls at 400 mm (16") on centre at edges and field unless otherwise required.
- .3 At typical board ceilings at 305 mm (12") on centre at edges and field unless otherwise required.
- .8 Offset gypsum board joints 150 mm (6") minimum from corners of openings.
- .9 Gypsum panel product joints shall be located so that no joint will align with the edge of an opening unless control joints are to be installed at these locations.

3.4 Exterior Sheathing Board Application – Gypsum Sheathing Board

- .1 Install in accordance with manufacturer's specifications, ASTM C1280-09, and GA 253-07.

3.5 Exterior Gypsum Soffits

- .1 Apply soffit board with long dimension across supports.
- .2 Position end joints over supports.
- .3 Allow at least 6 mm (1/4") between edge of soffit board and adjacent construction, unless otherwise indicated.
- .4 Fasten with corrosion-resistant screws.

3.6 Abuse/Abrasion Resistant Board Application

- .1 Install impact resistance gypsum board similarly to gypsum board as described above, and in strict accordance with manufacturer's instructions.
- .2 In corridors where gypsum board application is indicated or scheduled, install abuse/abrasion resistant boards for portions of wall below 1200 mm (47") and as indicated or scheduled.
- .3 Where both impact resistant gypsum panels and regular gypsum panels are used together on the same surface, ensure a smooth transition between the two types of panels. Finish the work in a manner such that the transition is not noticeable upon completion.

3.7 Acoustic Wall Assemblies

- .1 Acoustical sealant and plaster:
 - .1 Apply acoustical sealant in accordance with applicable requirements of ASTM C919-08.
 - .2 Apply bead of acoustic sealant to seal both sides of partition assembly between gypsum board and adjacent floor, wall, and ceiling assembly of partitions which contain sound attenuation insulation, and where noted.
 - .3 Apply bead of acoustic sealant to seal both sides of partition assembly at top and bottom of control joints.
 - .4 Apply bead of acoustic sealant to seal intersections with sound-isolating partitions that are extended to reduce sound flanking paths.
 - .5 Apply bead of acoustic sealant to seal joint between penetrations and gypsum board.

Gypsum Board

- .6 Completely seal objects at wall and gypsum board penetrations (such as electrical boxes) with heavy coating of premixed perlite plaster.
- .7 Apply sealant to clean, dry surfaces.
- .2 Sound attenuation insulation:
 - .1 Install sound attenuation insulation wherever insulation in partitions is indicated.
 - .2 Install sound attenuation insulation in partitions so indicated by filling voids with batts of specified thickness.
 - .3 Maintain air space between backs of sound attenuation insulation and back of opposite face layer, as applicable.
 - .4 Pack sound attenuation insulation against ducts, conduits and services passing through acoustic wall assemblies.
 - .5 Extend acoustic wall assemblies to underside of structure. Incorporate approved provision to prevent transmittance of structural deflection to partition assembly.
 - .6 Staple sound attenuation insulation where required by manufacturer's data.
 - .7 Where studs are not faced with gypsum board on both sides, mechanically fasten wire mesh to non-faced side of stud to retain insulation.
 - .8 Mechanically attach sound attenuation insulation in wall assemblies where cavity of wall assembly is greater than 150 mm (6").
 - .9 Secure insulation in such a manner that it will not sag.
- .3 Sound Flanking Paths:
 - .1 Where sound rated partition walls intersect non rated gypsum board partition walls, extend sound rated construction to completely close sound flanking paths through non rated construction.
 - .2 Seal joints between face layers at vertical interior angles of intersecting partitions.

3.8 Finishing

- .1 Provide levels of gypsum board finish for locations as follows, in accordance with GA-214.
 - .1 Level 1: Ceiling plenum areas 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 applied hard surfaces, except remove tool marks and ridges.
 - .3 Level 4: Exposed gypsum board surfaces, except where another finish level is indicated.
 - .4 Level 5: Where indicated.
- .2 Interior Gypsum Board:
 - .1 Prefill:
 - .1 Use setting-type joint compound. Mix joint compound according to manufacturer's directions.

Gypsum Board

- .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.
- .5 Joint gaps not greater than 3.2 mm (1/8") shall be prefilled with either ready-mix or setting type joint compound; joint gaps greater than 3.2 mm (1/8") shall be prefilled with setting-type joint compound.
- .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 Fastener heads and accessories shall be covered with 1 coat of joint compound.
- .4 Second coat (Level 3): After first coat treatment is dried, apply second coat of compound over tape and trim, feathering compound 50 mm (2") beyond edge of first coat.
 - .1 Fastener heads and accessories shall be covered with total of 2 separate coats of joint compound.
- .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 50 mm (2") 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 Finished joints will be accepted with a camber not greater than 1 mm (1/32") and shall be seamless, plumb, true and flush and with square, neat corners.
 - .4 Fastener heads and accessories shall be covered with total of 3 separate coats of joint compound.
- .6 Skim coat (Level 5):
 - .1 After the fourth coat has dried, apply skim coat of topping or all-purpose drying-type compound over exposed surfaces of gypsum board.
 - .2 After skim coat has dried, touch-up and sand to provide surface free of visual defects, tool marks, and ridges, and ready for application of finish.

Gypsum Board

- .3 Exterior Gypsum Board Soffits:
 - .1 Use setting-type joint compound.
 - .2 Prefill:
 - .1 Fill joints between boards with joint compound.
 - .2 Wipe off excess and allow compound to harden.
 - .3 Taping:
 - .1 Cover joint with thin layer of joint compound.
 - .2 Center tape over joints and press down into fresh compound.
 - .3 Remove excess compound.
 - .4 First coat:
 - .1 Immediately after bedding tape, apply skim coat of joint compound and allow to dry completely in accordance with manufacturer's instructions.
 - .2 Apply first coat of compound over flanges of trim and accessories.
 - .3 Smooth tool lap marks and other imperfections prior to hardening action of compound.
 - .5 Second coat:
 - .1 After first coat treatment has dried, apply second coat of joint compound over tape and trim, feathering compound 50 mm (2") beyond edge of first coat.
 - .2 Spot fasteners with second coat of compound.
 - .3 Smooth tool lap marks and other imperfections prior to hardening action of compound.
 - .6 Third coat:
 - .1 After second coat has dried, apply thin finish coat to joints and fasteners, feathering compound 50 mm (2") beyond edge of second coat.
 - .2 Smooth tool lap marks and other imperfections prior to hardening action of compound.
- .4 Joint Compound:
 - .1 Apply finish coat of compound feathering 75 to 100 mm (3" to 4") beyond tape edges.
 - .2 Feather coats onto adjoining surfaces so that camber is maximum 0.79 mm (1/32").
- .5 Trim:
 - .1 Use same fasteners to anchor trim accessory flanges as required to fasten gypsum board to supports, unless otherwise recommended by trim manufacturer.
 - .2 Install metal corner beads at external corners.
 - .3 Install metal casing bead trim whenever edge of gypsum base would otherwise be exposed or semi exposed, and where gypsum base terminates against dissimilar material.

Gypsum Board

- .4 Erect beads plumb or level, with minimum joints.
- .6 Control Joints:
 - .1 Provide control joints set in board facing. Support control joints with studs or furring channels on both sides of joint.
 - .2 Provide control joints in required locations.
 - .1 Review control joint locations with *Consultant* prior to installation.
 - .3 Full height door frames shall be considered equivalent to a control joint.
 - .4 Install control joints where a partition, wall, or ceiling traverses a construction joint (expansion, seismic or building control element) in the building structure.
 - .5 Install control joints where a wall or partition runs in an uninterrupted straight plane exceeding 9100 mm (30 linear feet).
 - .6 Install control joints in interior ceilings:
 - .1 With perimeter relief:
 - .1 Linear dimensions between control joints shall not exceed 15000 mm (50 ft) and total area between control joints shall not exceed 230 m² (2500 ft²).
 - .2 Without perimeter relief:
 - .1 Linear dimensions between control joints shall not exceed 9100 mm (30 ft) and total area between control joints shall not exceed 84 m² (900 ft²).
 - .7 Install control joints in exterior ceilings and soffits so that linear dimensions between control joints shall not exceed 4000 mm to 5000 mm (13'-1" to 16'-4") to, with no one dimension exceeding 2.5 x the other, and total area between control joints shall not exceed 20 m² (215 ft²).
 - .8 Install control joints where ceiling framing members change direction.
 - .9 Where a control joint occurs in an acoustical or fire-rated system, blocking shall be provided behind the control joint by using a backing material such as 16 mm (5/8") type X gypsum panel products, mineral fibre, or other tested equivalent. Construct through-wall control joints at fire-rated assemblies in accordance with assembly listing requirements.
 - .10 Line up control joints with joints in other construction or with centre lines of mullions, columns, piers, or similar building elements, where accepted by *Consultant*.
 - .11 Install control joints straight and true.
 - .12 Ceiling height door frames may be used as control joints. Less than ceiling height frames shall have control joints extending to the ceiling from both corners. If control joints are not used, additional reinforcement is required at corners to distribute concentrated stresses.
 - .13 Board joints shall be located so that no joint will align with the edge of an opening unless control joints are to be installed at these locations.
- .7 Construct light troughs and ceiling coves as indicated to profiles as shown, and prepare to receive lighting fixtures supplied and installed by Division 16 where required.

Gypsum Board

3.9 Fire Separations

- .1 Install fire-rated assemblies in accordance with assembly listing requirements in order to obtain fire ratings indicated and as required by authorities having jurisdiction.
- .2 Vertical bulkheads in ceiling spaces over fire rated partitions, doors and the like shall have same fire rating as the partition over which they occur. Such bulkheads shall be of gypsum board construction unless otherwise indicated.
- .3 Use fire rated gypsum wallboard as specified.
- .4 Where lighting fixtures, diffusers, and the like are recessed into fire rated ceilings or bulkheads, provide enclosure to maintain required fire rating. Form removable panel to give access to fixture outlet box.
- .5 Where fire hose cabinets or other fixtures or equipment are recessed in fire rated walls or partitions, provide gypsum board enclosure or backing to maintain required fire rating, unless otherwise detailed.

3.10 Access Doors

- .1 Install access doors to mechanical and electrical fixtures specified in respective sections of Division 15 and Division 16.
- .2 Access doors shall be as supplied by Division 15 and Division 16. Locations to be reviewed and confirmed by *Consultant*.
- .3 Install access panels in locations to be determined by coordination with trades installing mechanical, electrical and other building services and consultation with *Consultant*.
- .4 Rigidly secure frames to furring or framing systems.

3.11 Special Cleaning

- .1 Remove debris and rubbish from wall and ceiling cavities before enclosing with board.
- .2 Clean up and remove surplus materials and rubbish resulting from the work of this section upon completion.
- .3 Clean off beads, casings, joint compound droppings and the like, leave the work of this section ready for painting trades.

END OF SECTION

Tiling

PART 1 GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 Section Includes

- .1 Hard surface tiling.
- .2 Waterproofing under tiled assemblies.
- .3 Sound control underlayment, as indicated.
- .4 Trim accessories.

1.3 Quality Assurance

- .1 Execute work of this section only by a *Subcontractor* who has adequate plant, equipment, and skilled workers to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past 5 years.
- .2 *Subcontractor* shall be a member company in good standing of the Terrazzo, Tile and Marble Association of Canada and have been a member for at least the past 5 years.
- .3 Comply with 2009-2010 TTMAC Manual Specification Guide 09 30 00 Tile Installation Manual as produced by the Terrazzo, Tile and Marble Association of Canada.
- .4 Manufacturer shall provide field review in accordance with Section 01450.

1.4 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 LEED submittals:
 - .1 Submit LEED submittals in accordance with Section 01352, 01359 and 01611.
 - .2 Submit documentation to verify compliance with LEED objectives and requirements.
- .3 Samples:
 - .1 Submit full size samples of each type of tile specified.
- .4 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
 - .2 Submit manufacturer's installation instructions for *Products* proposed for use in the work of this section.
- .5 Tiling system manufacturer's system warranty and design criteria:
 - .1 Submit tiling system manufacturer's warranty specimen and warranty design criteria prior to the commencement of work of this section.
- .6 Shop drawings:
 - .1 Indicate location of expansion and control joints.

Tiling

- .7 Mock-ups:
 - .1 Submit:
 - .1 Grout mock-up: 610 mm x 610 mm (24" x 24") sample panels of each tile type and colour, texture, size, and pattern of tile and grout.
 - .2 Non-grouted dry laid mock-ups of 1200 mm x 1200 mm (47" x 47") area for each tile colour.
 - .2 Install each product and colour mock-up for acceptance by *Consultant*. Accepted mock-up shall form basis of standard of workmanship for remainder of work. Mock-up shall consist of floor/wall/base corner intersection, with 300 mm (12") of finish product on each face.
- .8 Closeout submittals:
 - .1 Submit closeout submittals in accordance with Section 01770.
 - .2 Maintenance materials:
 - .1 Provide minimum 2% of each type and colour of tile required for the *Work* for maintenance use.
 - .2 Maintenance material to be of same production run as installed material.
 - .3 Maintenance data:
 - .1 Submit maintenance instructions for inclusion in the maintenance manuals.

1.5 LEED Requirements

- .1 Comply with the requirements of Sections 01352, 01355, 01359, and 01611, as applicable.
- .2 Waste management and disposal:
 - .1 Comply with the waste management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01355. Comply with the directions of the *Contractor's* LEED coordinator with regard to waste management and disposal activities.
- .3 Construction indoor air quality (IAQ) management:
 - .1 Comply with the IAQ management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01359. Comply with the directions of the *Contractor's* LEED coordinator with regard to IAQ management activities.
- .4 Recycled Content and Regional Materials:
 - .1 Wherever possible, materials used in work of this Section are to contain high amounts of recycled content and are to be sourced regionally from within 800 km via truck or 2400 km via rail or ship from jobsite in accordance with Section 01611.

Tiling

1.6 Environmental Requirements

- .1 Environmental Conditions: Execute work of this section while temperature is maintained within safe working temperatures in accordance with manufacturer's installation instructions for a period of 72 hours before, during and following installation. Avoid concentrated or irregular heating during curing period.
- .2 Protection: Protect work of this section against damage by work of other sections for a minimum of 72 hours after application of grouting by prohibiting passage of traffic over tile. Do not immerse in water and protect tilework from freezing for at least 28 days after installation.

1.7 Sequencing and Scheduling

- .1 Coordinate installation of tile work with related work.
- .2 Proceed with tile work only after curbs, vents, drains, piping, and other projections through substrate have been installed and when substrate construction and framing of openings have been completed.

1.8 Warranty

- .1 Warrant work of this section for a period of 2 years, in accordance with Section 01780.

PART 2- PRODUCTS

2.1 Tile Products

- .1 Ceramic and Porcelain tile: in accordance with Room Finish Schedule.

2.2 Adhesive and Mortar Materials

- .1 Unless otherwise specified, select from the following thin-set adhesives:
 - .1 Latex modified portland cement thin bed mortar gauged:
 - .1 Interior and exterior grade.
 - .2 ANSI A118.4-2008 and ANSI A188.11.
 - .3 White colour for translucent tile applications.
 - .4 Acceptable products:
 - .1 Flextile '51' mixed with Flextile '44'.
 - .2 Laticrete 'Laticrete 4237 Latex Thin Set Liquid' with 'Portland 211 Crete Filler Powder'.
 - .3 Mapei 'KERALASTIC' mixed with 'KERABOND'.
 - .2 Special adhesive and setting materials:
 - .1 For large format tiles with dimension measured along any edge 450 mm (18") and greater:
 - .1 Enriched, modified, portland cement medium bed mortar for large format tiles with dimension measured along any edge 450 mm (18") and greater:
 - .1 Interior and exterior grade.
 - .2 Polymer enriched, non-sag formula.

Tiling

- .3 ANSI A118.4-2008 and ANSI A188.11.
- .4 White colour for translucent tile applications.
- .5 Acceptable products:
 - .1 Flextile '56SR'
 - .2 Mapei 'Ultraflex LFT'.
 - .3 Laticrete '220 Marble and Granite'.
- .2 For glass and glass-mosaic tiles:
 - .1 Enriched, modified, portland cement thin bed mortar:
 - .1 Interior grade.
 - .2 Polymer enriched, non-sag formula.
 - .3 ANSI A118.4 and ANSI A188.11.
 - .4 White colour for translucent tile applications.
 - .5 Acceptable products:
 - .1 Flextile '51' mixed with Flextile '44'.
 - .2 Mapei 'Adesilex P10'.
 - .3 Laticrete 'Laticrete 4237 Latex Thin Set Liquid' with 'Portland 211 Crete Filler Powder'.
- .3 Mortar beds, levelling coats:
 - .1 Materials:
 - .1 Water: clean and free of chemicals detrimental to mortar and grout mixes.
 - .2 Sand: to ASTM C144-04, passing 16 mesh.
 - .3 Cement: to CSA A3000-03, Type U.
 - .4 Latex: Formulated for use with Portland cement mortars.
 - .5 Cleavage membrane: 0.10 mm (4 mil) thick polyethylene film to CAN/CGSB 51.34-M86.
 - .6 Metal lath: Galvanized type, 1.4 kg/m³ to ASTM C847-09.
 - .7 Reinforcing mesh: 51 mm x 51 mm (2" x 2") mesh size, fabricated from 1.6 mm thick galvanized steel wire; welded fabric design.
 - .2 Mixes:
 - .1 Scratch coat (by volume): 1 part Portland cement, 4 parts sand, and water or latex where required by TTMAC detail. Premixed mortar may be used per manufacturer's instructions. Adjust liquid volume may be adjusted depending on water content of sand to obtain consistency and workability.
 - .2 Slurry bond coat: Mix Portland cement and water to a creamy paste consistency. Include latex additive where required by TTMAC detail.

Tiling

- .3 Mortar bed for walls (by volume): 1 part Portland cement, 4 parts sand, and water or latex where required by TTMAC detail. Premixed mortar may be used per manufacturer's instructions. Adjust liquid volume may be adjusted depending on water content of sand to obtain consistency and workability.
- .4 Levelling coat (by volume): 1 part Portland cement, 4 parts sand, and water or latex where required by TTMAC detail. Premixed mortar may be used per manufacturer's instructions. Adjust liquid volume may be adjusted depending on water content of sand to obtain consistency and workability.
- .5 Mortar bed for floors (by performance): 1 part Portland cement, 4 parts sand, and water or latex where required by TTMAC detail. Premixed mortar may be used per manufacturer's instructions. Adjust liquid volume may be adjusted depending on water content of sand to obtain consistency and workability that will allow compaction during tamping of the mortar bed, and achieve minimum compressive strength of 15 MPa after 28 days.

2.3 Grout Materials

- .1 Polyurethane grout:
 - .1 Chemical, stain, and mildew resistant.
 - .2 Exceptional colour consistency.
 - .3 Indoor/outdoor service grade.
 - .4 For joints greater than 1.5 mm (1/16") less than 12.7 mm (1/2").
 - .5 ANSI A118.3-2008.
 - .6 Cured polyurethane grout to be chemically and stain resistant to ketchup, mustard, tea, coffee, milk, soda, beer, wine, bleach (3% solution), ammonia, juices, vegetable oil, detergents, brine, sugar, cosmetics and blood, as well as being chemically resistant to dilute food/mineral acids, gasoline and mineral spirits.
 - .7 Acceptable products:
 - .1 Flextile 'ColourMax Plus'.
- .2 Grout colours to later selection by *Consultant* from manufacturer's full range.
- .3 Grout sealer: as recommended by grout manufacturer.

2.4 Waterproofing Materials – Sheet Applied

- .1 Unmodified thin-set mortar; for setting tile and constructing waterproofing membrane seams: Portland cement-base unmodified thin-set mortar, ANSI A108.1.

2.5 Sound Control Underlayment

- .1 Sound Control Underlayment shall be load bearing, shock and vibration resistant. Impact Isolation Class (IIC) rating test based on 150 mm (6") concrete slab with a drop ceiling, ASTM E492
- .2 Acceptable products:
 - .1 Flextile 1000 Flexilastic'.
 - .2 Flextile 2000FC Flexilastic'.

Tiling

- .3 Laticrete '18 Sound Control Underlayment (Standard or PLUS Configurations).
- .4 Mapei 'Mapeguard 2'.
- .5 Mapei 'Mapesonic SM' (IIC 69).

2.6 Accessories and Related Materials

- .1 Floor levelling and repair compound: "Ultra/Plan" High Compressive Strength Self-Levelling Underlayment as manufactured by Mapei.
- .2 Trim accessories: in accordance with manufacturers recommendations.
- .3 Joint sealants: mildew resistant sealant in accordance with Section 07900.
- .4 Expansion and control joint sealant:
 - .1 One-component, neutral cure, exterior grade silicone sealant.
 - .2 Tensile Strength (ASTM C794-06): 1.5 MPa (225 psi).
 - .3 Hardness (ASTM D751-06; Shore A): 25 (coloured sealant)/15 (clear sealant)
 - .4 Weather Resistance (QUV Weather-ometer): 10000 hours (no change)
 - .5 Acceptable products:
 - .1 Flextile 'Tile & Grout Caulk'.
 - .2 Laticrete 'Latasil Tile and Stone Sealant'.

PART 3- EXECUTION

3.1 Examination

- .1 Ensure compatibility of *Products* supplied under this section, and which bear contact with substrate.
- .2 Before work of this section commences, examine the areas to be covered and report any flaw or adverse conditions in writing to the *Contractor* and the *Consultant*. Do not proceed with the tilework until surfaces and conditions comply with the requirements indicated in the manufacturer's instructions and in ANSI A108.5-2008 specification.
- .3 Miscalibrated tiles, tiles with chipped corners, tiles with holes, will not be accepted for installation.
- .4 Carefully inspect the tiles for colour variation. Tiles presenting noticeable variations shall be carefully selected, set aside and used in areas where they fit in the pattern homogeneously. Provide for appropriate lighting equipment in addition to existing lighting in the immediate area where the installation is being performed so that any shade differences which are normally very slight can be identified easily.

3.2 Preparation

- .1 Wall Surfaces:
 - .1 Roughen previously painted surfaces having hard glossy finish by sandpaper or other abrasive medium, and completely remove finishes which are not compatible with compounds specified under this section, and that are to be in contact with such objectionable finishes.

Tiling

- .2 Remove all foreign matter such as loose mortar, plaster, visible laitance, cement, form release agents, dust and the like which would otherwise impede bonding of levelling coat or mortars.
- .3 Prime very dry gypsum, wood or porous concrete with primer, brush or roller applied at full strength in accordance with adhesive manufacturer's recommendations.
- .2 Floor Surfaces:
 - .1 Completely remove oil, grease, waste and all other contaminants from floor areas scheduled to receive new ceramic tile.
 - .2 Mechanically or chemically (using trisodium phosphate or similar material) remove all paints, adhesives or other previously applied compounds to expose clean surface of existing concrete substrate. Do not use any acids.
 - .3 Levelling Underlayment: Where substrate varies beyond limitations as set forth hereinafter, prime substrate, mix and apply underlayment in accordance with manufacturer's instructions.
 - .4 Concrete shall be minimum of 120 days old.
 - .5 Wire brush steel substrates to remove deleterious substances and rust, to promote full adhesion to steel.
 - .6 Provide levelling coat where required to bring surfaces to true even plane. Allow levelling coat to completely cure prior to installation of tile finish.
- .3 Mixing:
 - .1 General: Mix mortars, additives and grouts in strict accordance with manufacturer's requirements.
 - .2 Rotating blade mechanical mixer: Pour latex additive, start mixer and add sand first, followed by Portland cement. Mix no mortar in same mixer as a dissimilar type of mortar unless the mixer is first thoroughly washed clean.
 - .3 Pail batch mixing with low revolution drill mixers as follows:
 - .1 Premix separately prior to adding to the latex additive.
 - .2 Pour latex additive into clean mixing vessel and add dry materials slowly while mixing into a homogeneous and smooth consistency.

3.3 Installation Tolerances

- .1 Maximum allowable lippage:
 - .1 Tile up to 152 mm x 152 mm (6" x 6") in size: 1 mm (0.040").
 - .2 Tile greater than 152 mm x 152 mm (6" x 6") in size: 2 mm (0.080").
- .2 Finish planes shall be straight and plumb to within 6 mm in 3 m (1/4" in 10 feet).

3.4 Installation - General

- .1 Install products in accordance with manufacturer's specifications and as indicated herein.

Tiling

- .2 Install in accordance with 2009-2010 TTMAC Manual Specification Guide 09 30 00 Tile Installation Manual as produced by the Terrazzo, Tile and Marble Association of Canada, except where specified otherwise.
- .3 Install in accordance with ANSI A108.5-2008 and ANSI A108.10-2008.
- .4 Lay out tile work as indicated on drawings, and where lay-out not indicated, lay-out tiles so tiles less than 1/2 the least dimension do not occur and with minimum amount of cutting.
- .5 Make joints even, straight, plumb and of uniform width.
- .6 Provide mortar beds and levelling coats in accordance with TTMAC details.
- .7 Provide uniform positive slope to floor drains, to minimum allowable slope of 20 mm/m (1/4 inch/ft).
- .8 Provide edge protection at tile edges and corners, unless otherwise indicated, using maximum length pieces.
- .9 Provide edge protection and transition strips at tile transitions, unless otherwise indicated, using maximum length pieces.
- .10 Apply sealant at interface with frames at openings. Apply sealant in accordance with Section 07900 and manufacturer's instructions. Sealant colour to later selection by *Consultant*.
- .11 Install flooring to entire area indicated or scheduled unless otherwise indicated, including coverplates occurring within finished floor areas. Maintain overall continuity of colour and pattern with pieces of flooring installed on cover plates. Tightly butt edges to perimeter of floor around cover plates and to cover plates. Do not install flooring to floor drains occurring within finished floor areas.
- .12 Review locations of tile accessories with *Consultant* prior to setting tile and comply with directions of *Consultant*.

3.5 Setting

- .1 Using a damp towel, wipe off the back side of floor tile to remove any dust or other residue that may be left over from the manufacturing process.
- .2 Place as much tile as possible in one operation before setting bed reaches initial set. Clean back and remove bed when it has set before tile is laid.
- .3 Prime materials and by methods specified by manufacturer of bond coat.
- .4 Except where tiles have setting tabs, and except for expansion, control and isolation joints, maintain joint widths as selected by *Consultant*.
- .5 Back up tile coves, curbs and other shaped pieces solid with mortar. Rigidly set, reinforce or otherwise make firm and secure such pieces.
- .6 Beat tiles in thoroughly and sufficiently to cause mortar ribs or notches to come together into a continuous void free bed and allow the mortar to flow up partially into the joint space to maximum of 1/3 the thickness of the tile. Sound floor tiles by tapping and reset all tiles with voids in setting bed.
- .7 Tile shall contact setting materials for minimum of 95% coverage.
- .8 Remove any excess setting material from the joint area so that 2/3 of the depth of the tile is available for grouting.

Tiling

- .9 Remove smudges or smears of setting material from the tile surface with a damp sponge or cloth immediately after final adjustment and beat-in while the mortar is fresh.
- .10 Do necessary cutting and drilling of fixtures, fittings, and built-in or penetrating units without marring the tile. Replace all cracked or damaged tile.
- .11 Extend tile into recesses at windows, doors, or other openings.
- .12 Extend tiles 100 mm (4") behind mirrors, and fully behind cabinets, cupboards and other fixed objects at walls.
- .13 Cut tiles to conform to irregularities in wall lines and vertical planes along outer edges. Smooth cut edges with carborundum block or by other means to provide clean straight edge.
- .14 At floor drains in mortar bed: *Provide* minimum setting bed of 10 mm (3/8"), sloped to drain at 6 mm (1/4") in 305 mm (12").

3.6 Sheet Waterproofing Membrane Installation

- .1 Install to provide watertight performance to the following locations unless otherwise indicated:
 - .1 Install to shower floors and install on associated vertical surfaces up to underside ceiling.
- .2 Install waterproofing to comply with ANSI A108.13-2008 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.
- .3 Remove dust, dirt, oil, grease, paint, laitance, efflorescence, curing compounds, sealers, water repellents and other materials that prevent bond. Metal plumbing pipe penetrations and fixtures must be clean of oil, grease, rust and other potential bond breakers.
- .4 Work waterproofing membrane into adhesive with a flat trowel to achieve full contact and to remove air pockets.
- .5 Install prefabricated corners at outside and inside corner conditions.
- .6 Install prefabricated pipe collars at penetrations.
- .7 Install waterproofing strips at corner conditions at change in substrate plane conditions and where required by manufacturer's installation instructions.
- .8 Provide strips of waterproofing where required to span expansion joints or terminate waterproofing into movement joint type tile setting accessories, in accordance with manufacturer's instructions.
- .9 Seal waterproofing at penetrations and terminations in accordance with manufacturer's installation instructions.

3.7 Crack Suppression Membrane (Crack Isolation Membrane) Installation

- .1 Install membrane in accordance with manufacturer's instructions.
- .2 Prepare substrate in accordance with manufacturer's instructions.
- .3 Install crack suppression membrane to substrates for tile flooring installations located on suspended structural floor assemblies. Treat substrate with full coverage of crack isolation membrane and reinforcement in accordance with crack isolation membrane manufacturer's installation instructions.

Tiling

- .4 Review floor assembly design (live load deflection) with *Consultant* and crack isolation membrane manufacturer's representative. Confirm crack isolation manufacturer's recommended product to *Consultant* in writing, on crack isolation membrane manufacturer's company letterhead prior to commencing the installation..

3.8 Mortar-Bed Tiling

- .1 Apply latex-Portland cement thin bed mortar with flat trowel as a slurry bond coat approximately 1.5 mm (1/16") thick over clean concrete slab.
- .2 Place latex-Portland cement thick bed mortar over slurry bond coat while bond coat is wet and tacky. Omit reinforcing wire fabric and fully compact bed by tamping.
- .3 Spread latex-Portland cement thin bed mortar with flat trowel over surface of "green"/fresh mortar bed as a slurry bond coat approximately 1.5 mm (1/16") thick.
- .4 Apply latex-Portland cement thin bed mortar slurry bond coat to back of tile or threshold and place each piece/sheet while slurry bond coats are wet and tacky. Beat with a hardwood block or rubber mallet to level/imbed pieces before mortar bed takes initial set.
- .5 Clean excess mortar/adhesive from finished surfaces.
- .6 For installation of tile over cured (pre-floated) latex-Portland cement thick bed mortar, follow Thin Bed Method.

3.9 Thin-Set Method

- .1 Use the appropriate trowel notch size to ensure full bedding of the tile.
- .2 Work the latex Portland cement mortar into good contact with the substrate and comb with notched side of trowel.
- .3 Spread only as much latex Portland cement mortar as can be covered while the mortar surface is still wet and tacky.
- .4 When installing large format (>200 mm x 200 mm (8" x 8")) tile/stone, rib/button/lug back tiles, pavers or sheet mounted ceramics/mosaics, spread latex Portland cement mortar onto the back of (i.e. 'back-butter') each piece/sheet in addition to trowelling latex Portland cement mortar over the substrate.
- .5 Beat each piece/sheet into the latex Portland cement mortar with a beating block or rubber mallet to insure full bedding and flatness.
- .6 Allow installation to set until firm.
- .7 Clean excess latex Portland cement mortar from tile face and joints between pieces.
- .8 Do not cover, bridge or fill tile joints located over expansion joints with adhesive.

3.10 Control Joints

- .1 Carry substrate control and movements joints through to tile work.
- .2 Install control joints around the perimeter of tiled areas, around columns and where tile abuts other hard materials, also incorporate control joints over all building expansion joints.
- .3 Cut tiles or stones on both sides along the edges of control or expansion joints.

Tiling

- .4 Provide control joints equal to width of interior tile joints in floors and walls at perimeters of floor and within 7300 mm to 11 m (24 ft to 36 ft) centre to centre by raking out joints to full depth of tile and cleaning joints for application of sealant in accordance with Section 07900. In areas subject to sunlight or exposed to exterior provide control joints within 2400 mm to 3500 mm (8 ft to 12 ft) centre to centre.
 - .1 Review locations with *Consultant* prior to setting tile and comply with instruction given by *Consultant*.
- .5 Control joint width: 6.4 mm (1/4") minimum.

3.11 Sealer Installation

- .1 Apply 2 sealer coats in accordance with manufacturer's printed installation instructions, over cleaned stone flooring surfaces (stone and grout) surfaces as scheduled in Part 2 of this section.
 - .1 Apply at manufacturer's recommended coverage rate, for full saturation of flooring surfaces, free of excess material.
 - .2 Prior to grout installation: Apply 1 sealer coat prior to application of grout. Apply over clean floor tile minimum of 2 hours prior to grouting.
 - .3 After grout installation: Apply 1 sealer coat after grouting and related clean-up. Wait prescribed time period after application of grout prior to application of sealer over grouted flooring.
 - .1 If 2 or more coats are applied, allow a minimum of 30 minutes drying time between coats. Remove surface residue after each application.
- .2 Remove sealer that does not penetrate surface is polished dry off surface within 5 minutes of each application.
- .3 Do not allow sealer to come in contact with surfaces not scheduled to receive sealer.

3.12 Grouting or Pointing

- .1 Chemical resistant, water cleanable tile-grouting epoxy:
 - .1 Follow manufacturer's recommendations for minimum cure time prior to grouting. Store liquid components of grout for 24 hours at 21-27°C prior to use to facilitate mixing and application unless otherwise indicated in manufacturer's installation instructions.
 - .2 Substrate temperature must be 4-35°C unless otherwise indicated in manufacturer's installation instructions.
 - .3 Verify joints are free of dirt, debris or grout spacers.
 - .4 Sponge or wipe dust/dirt off tile faces and remove water standing in joints.
 - .5 Apply grout release to face of absorptive, abrasive, non-slip or rough textured tile units that are not hot paraffin coated to facilitate cleaning.
 - .6 Spread using a sharp edged, hard rubber float and work grout into joints.
 - .7 Using strokes diagonal (at 45° angle) to the grout lines, pack joints full and free of voids/pits. Then hold float face at a 90° angle to grouted surface and use float edge to "squeegee" off excess grout, stroking diagonally to avoid pulling grout out of filled joints.

Tiling

- .8 Once excess grout is removed, begin cleaning grout haze approximately 20-30 minutes after grouting depending on temperature. Using a circular motion, lightly scrub grouted surfaces with the damp sponge to dissolve grout film/haze. Then drag sponge diagonally over the scrubbed surfaces to remove froth. Rinse sponge frequently and change cleaning solution at least every 4.7 m² (50 ft²). Discard sponges as they become "gummy" with residue.
- .9 Within 1 hour of finishing first cleaning, clean the same area again following the same procedure but utilizing a clean white scrub pad and fresh cleaning solution. Rinse scrub pad frequently. Drag a clean sponge diagonally over the scrubbed surfaces to remove froth. Use each side of sponge only once before rinsing and change cleaning solution at least every 4.7 m² (50 ft²). Allow cleaned areas to dry and inspect tile surface. Rinse with clean water and allow surface to dry. Inspect grout joint for pinholes/voids and repair them with freshly mixed grout.
- .2 Polymer modified cement grout:
 - .1 Allow tile installation to cure a minimum of 24 hours @ 21°C.
 - .2 Verify grout joints are free of dirt, debris or tile spacers.
 - .3 Sponge or wipe dust/dirt off veneer face and remove any water standing in joints.
 - .4 Apply grout release to face of absorptive, abrasive, non-slip or rough textured tile units that are not hot paraffin coated to facilitate cleaning.
 - .5 Surface temperature must be between 4-35°C.
 - .6 Dampen dry surfaces with clean water.
 - .7 Spread using a sharp edged, hard rubber float and work grout into joints.
 - .8 Using diagonal (at 45° angle to direction of grout line) strokes, pack joints full and free of voids/pits.
 - .9 Hold float face at a 90° angle to grouted surface and use float edge to "squeegee" off excess grout, stroking diagonally to reduce pulling grout out of filled joints.
 - .10 Initial cleaning can begin as soon as grout has become firm, typically 20-30 minutes after grouting depending on temperature. Drag a clean towel dampened with water, or wipe a clean, dampened sponge, diagonally over the veneer face to remove any grout haze left after "squeegeeing."
 - .11 Once excess grout is removed, begin cleaning grout haze approximately 20-30 minutes after grouting, but no later than once grout is fully cured. Using a circular motion, lightly scrub grouted surfaces with the damp sponge to dissolve grout film/haze. Then drag sponge diagonally over the scrubbed surfaces to remove froth. Rinse towel/sponge frequently and change rinse water at least every 2 m² (200 ft²). Repeat this cleaning sequence again if grout haze is still present.
 - .12 Allow grout joints to become firm. Buff surface of grout with clean coarse cloth. Inspect joint for pinholes/voids and repair them with freshly mixed grout. Within 24 hours, check for remaining haze and remove it with warm soapy water and a nylon scrubbing pad, using a circular motion, to lightly scrub surfaces and dissolve haze/film.
- .3 Apply grout in accordance with manufacturer's printed instructions. Use sanded grout for joint size of 3 mm (1/8") and greater.

Tiling

- .4 Grout joint width to be a maximum of 3.2 mm (1/8"), flat joints not concaved, unless otherwise indicated.
- .5 Use caution when using sanded grouts to prevent scratching of tile or other material surfaces.
- .6 Do not cover, bridge or fill any expansion joints in tile with grout.

3.13 Protection and Clean-Up

- .1 Clean installed tile surfaces after installation and grouting cured.
- .2 Re-point joints after cleaning to eliminate imperfections. Avoid scratching tile surfaces.

END OF SECTION

Specialty Acoustic Components

PART 1 - GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 Section Includes

- .1 Tectum panels.

1.3 Quality Assurance

- .1 Qualifications: *Provide* work of this section, executed by competent installers with minimum 5 years experience in application of *Products*, systems and assemblies specified and with approval and training of *Product* manufacturers.
- .2 Single source responsibility: Obtain system components for each panel system type from a single source with resources to provide *Products* of consistent quality in appearance and physical properties without delaying progress of the *Work*.
- .3 Coordination of work: coordinate layout, penetrations and installation of work of this section with work of other sections.
- .4 Conduct a pre-installation meeting in accordance with Section 01312.
- .5 Quality control to be in accordance with Section 01450, supplemented as follows:
 - .1 Independent inspection and testing company shall attend the pre-installation meeting.
 - .2 Independent inspection and testing company shall perform random load tests for ceiling anchor installations.

1.4 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 LEED submittals:
 - .1 Submit LEED submittals in accordance with Section 01352, 01359 and 01611.
 - .2 Submit documentation to verify compliance with LEED objectives and requirements.
- .3 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .4 Acoustic data:
 - .1 Submit acoustic data verifying that *Products* meet specified acoustic design requirements. Acoustic data submitted shall be from a certified acoustic testing agency.
- .5 Shop drawings:
 - .1 Submit shop drawings, indicating panel layout and system components, for each panel system, in accordance with Section 01330.

Specialty Acoustic Components

- .2 Include plans, sections and large scale details, and indicate components and methods of assembly, materials and their characteristics, fastenings, finishes, and other fabrication information required for the work of this section. Indicate assembly joint lines.
- .3 Submit coordination drawings indicating locations of concealed grounds, cutouts, plates, and other required fabrications.
- .4 Show relation to adjoining construction, details of outside and inside corners and door openings.
- .6 Samples:
 - .1 Submit 2 - 300 mm (12") x 300 mm (12") samples of each component of panel system to *Consultant* for review.
 - .2 Samples shall fully represent materials to be supplied in colour, texture, finish and construction.
- .7 Mock-ups:
 - .1 Submit 3000 mm (118") x 3000 mm (118") mock-up of each acoustical finish system, for review and acceptance by *Consultant*.
 - .2 Install at the *Place of the Work* a pre-selected job mock-up of full size panel system.
 - .3 Obtain *Consultant's* acceptance of surface, finish and workmanship as a standard by which remainder of the *Project* will be judged. Apply material in accordance with manufacturer's written application instructions. Mock-up must be approved and accepted prior to start of system application. Maintain mock-up during construction for workmanship comparison. Do not alter, move or destroy mock-up until the work is completed and approved by *Consultant*.
- .8 Closeout submittals:
 - .1 Submit closeout submittals in accordance with Section 01 7700.
 - .2 Maintenance instructions:
 - .1 Submit manufacturer's maintenance instructions for incorporation into the operation and maintenance manual.
 - .3 Maintenance materials:
 - .1 At completion, hand over to *Owner* an additional 1% of each type of fabric material required for this project for maintenance use. Store where directed. Clearly identify each box..

1.5 LEED Requirements

- .1 Comply with the requirements of Sections 01352, 01355, 01359, and 01611, as applicable.
- .2 Waste management and disposal:
 - .1 Comply with the waste management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01355. Comply with the directions of the *Contractor's* LEED coordinator with regard to waste management and disposal activities.

Specialty Acoustic Components

- .3 Construction indoor air quality (IAQ) management:
 - .1 Comply with the IAQ management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01359. Comply with the directions of the *Contractor's* LEED coordinator with regard to IAQ management activities.
- .4 Recycled Content and Regional Materials:
 - .1 Wherever possible, materials used in work of this Section are to contain high amounts of recycled content and are to be sourced regionally from within 800 km via truck or 2400 km via rail or ship from jobsite in accordance with Section 01611.

1.6 Warranty

- .1 Warrant work of this section for a period of 2 years, in accordance with Section 01780.

PART 2 - PRODUCTS

2.1 Tectum Panels and Clouds

- .1 Material: Aspen wood fibres bonded with inorganic hydraulic cement.
- .2 Thickness: 25 mm (1") minimum.
- .3 Sizes: as indicated.
- .4 Performance: NRC 0.85, minimum.
- .5 Finish: field painted in accordance with Section 09900, colour to match adjacent wall or ceiling surface.
- .6 Edges: square.
- .7 Flame spread: 25 or less in accordance with ASTM E84.
- .8 Acceptable *Product*:
 - .1 Panels: 'Tectum Panels complete with batt insulation, 25.4 mm (1") furring strips and 25.4 mm (1") noise barrier batts, as manufactured by Tectum Inc., and distributed by Sound Solutions.
 - .2 Clouds: 'Tectum Cloud Panels complete with batt insulation, 25.4 mm (1") furring strips and 25.4 mm (1") noise barrier batts, as manufactured by Tectum Inc., and distributed by Sound Solutions.

PART 3- EXECUTION

3.1 General

- .1 Install system in accordance with manufacturer's written installation instructions.
- .2 Panel arrangements as indicated. Coordinate layout with *Consultant* prior to commencing installation.
- .3 Do not commence installation until work of other sections behind panels has been completed, inspected and accepted by *Consultant*.

Specialty Acoustic Components

- .4 Install finished work rigid, secure, square, level and plumb, framed and erected to maintain dimensions and contours indicated. Make allowance for thermal and structural movement.

3.2 Installation

- .1 Install acoustical panels to clean, dry and firm substrates in accordance with manufacturer's written instructions.
- .2 Panels shall have no visible fastenings. Faces of panels and bulkheads must be flush.
- .3 Install fabric systems with grain patterns and seams level, plumb and true.

3.3 Cleaning and Completion

- .1 Carefully examine work of this section on completion and replace uneven or defective materials, eliminate all waves, remedy damaged exposed finished surfaces and remove soiled or stained areas.

END OF SECTION

Wood Flooring

PART 1 - GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 Section Includes

- .1 Wood flooring.

1.3 Quality Assurance

- .1 Qualifications: Provide work of this section, executed by competent installers with minimum 10 years experience in application of *Products*, systems and assemblies specified and with approval and training of *Product* manufacturers.
- .2 Conduct a pre-installation meeting in accordance with Section 01312.
- .3 Conduct quality control in accordance with Section 01450. Independent inspection and testing company shall attend the pre-installation meeting.
- .4 Conduct quality control in accordance with NWFA (National Wood Flooring Association) Installation Guidelines – March 2007.
- .5 Manufacturer's field review to be in accordance with Section 01450.

1.4 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 LEED submittals:
 - .1 Submit LEED submittals in accordance with Section 01352, 01359 and 01611.
 - .2 Submit documentation to verify compliance with LEED objectives and requirements.
- .3 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
 - .2 Submit NWFA (National Wood Flooring Association) standards for installation and sanding and finishing guidelines for hardwood flooring.
- .4 Samples:
 - .1 Submit duplicate 300 mm (12") long sample of each type of finish flooring strip specified.
 - .2 Submit duplicate 300 mm (12") long sample of each type of transition trim and finish specified.
- .5 Mock-ups:
 - .1 Provide minimum 3050 mm x 3050 mm (120" x 120") mock-up of floor in location as directed by *Consultant*.
 - .2 Retain approved mock-up for judging completed floor.
- .6 Closeout submittals:

Wood Flooring

- .1 Submit closeout submittals in accordance with Section 01770.
- .2 Submit manufacturer's instructions for incorporation into maintenance manuals.
- .3 Deliver 2% of each type of flooring material required for the *Work* for maintenance use. Store where directed. Clearly identify each box.
- .4 Maintenance materials to be same production run as installed materials.

1.5 LEED Requirements

- .1 Comply with the requirements of Sections 01352, 01355, 01359, and 01611, as applicable.
- .2 Waste management and disposal:
 - .1 Comply with the waste management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01355. Comply with the directions of the *Contractor's* LEED coordinator with regard to waste management and disposal activities.
- .3 Construction indoor air quality (IAQ) management:
 - .1 Comply with the IAQ management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01359. Comply with the directions of the *Contractor's* LEED coordinator with regard to IAQ management activities.
- .4 Recycled Content and Regional Materials:
 - .1 Wherever possible, materials used in work of this Section are to contain high amounts of recycled content and are to be sourced regionally from within 800 km via truck or 2400 km via rail or ship from jobsite in accordance with Section 01611.

1.6 Environmental Requirements

- .1 Install materials of this section only when surfaces and air temperatures have been maintained between 18°C and 32°C for 48 hours preceding installation, and will be so maintained during installation and for 48 hours thereafter. Maintain a minimum temperature of 13°C after above period.
- .2 Ensure that adequate ventilation is provided during installation and curing of materials of this section.
- .3 Concrete floors are to be dry, and exhibit negative alkalinity, carbonization, or dusting, and be free of curing/sealing compounds, residue from paint and adhesives.
- .4 Conduct the tests in accordance with ASTM F710-08 and the following:
 - .1 Test for moisture vapour transmission in accordance with ASTM F710-08 and ASTM F1869-04 or ASTM F2170-02 in accordance with manufacturer's written flooring installation instructions. Results must not exceed 170 µg/m² (3 pounds per 1,000 square feet) in 24 hours when tested to ASTM F1869-04, or exceed 75% when tested to ASTM F2170-02.
 - .2 Test for surface pH. Levels of pH shall not exceed the written recommendations of the flooring manufacturer and adhesive manufacturer. Test in accordance with ASTM F710-08.

Wood Flooring

- .3 For each test type: Conduct 3 tests for flooring applications up to 93 m² (1000 square feet) in area, and 1 additional test for each additional 93 m² (1000 square feet) of flooring area.
- .4 Testing shall be conducted by independent inspection and testing company and in accordance with Section 01450.
- .5 In areas that are exposed to intense or direct sunlight, *Products* shall be protected during the conditioning, installation, and adhesive curing periods, by covering the light source.

1.7 Warranty

- .1 Warrant work of this section for a period of 2 years, in accordance with Section 01780.

PART 2 - PRODUCTS

2.1 Sustainable Design Requirements

- .1 Wood products used in work of this section shall be Forestry Stewardship Council (FSC) Certified. Parties who claim ownership of the wood must have chain of custody certification.
- .2 Wood-based composite / agrifibre materials are to contain no added urea-formaldehyde resins and laminate adhesives are not to contain urea-formaldehyde.

2.2 Materials

- .1 Sheet vapour barrier:
 - .1 Polyethylene film: to CAN/CGSB 51.34-M86 AMEND., Type 1, 0.15 mm (6 mil) thick.
 - .2 Lap sealant; acoustical sealant:
 - .1 Acceptable manufacturers:
 - .1 Tremco
 - .2 Bakor
- .2 Plywood: 19 mm (3/4") thick exterior (DFP), plywood to CSA O121-M1978, sheathing grade, urea-formaldehyde free.
- .3 Finished flooring: 19 mm (3/4") x 57 mm (2-1/4") random lengths, tongue and groove edges and matched ends, CLA graded maple flooring by Tembec Forest Products Group 2nd or better grade..
- .4 Construction adhesive: to requirements of American plywood Association AFG-01, ASTM C557-03e1, ASTM D3498-03, and FHA UM60, Premium Grade, and as recommended by manufacturer.
- .5 Adhesive: 100% solids, moisture-curing urethane wood adhesive.
 - .1 Mapei 'Ultrabond 980'.
- .6 Resilient adhesive: two component mastic adhesive as recommended and approved by wood flooring manufacturer.
- .7 Screws; for plywood: zinc plated, #8 flat head Robertson wood screws.

Wood Flooring

- .8 Screws; for attaching plywood to concrete:
 - .1 Tapcon hardened concrete screws, 6.3 mm (1/4") diameter Phillips flat head, zinc plated, length sufficient to allow 19 mm (3/4") embedment in concrete, minimum.
- .9 Fasteners:
 - .1 Nails; for attaching wood flooring:
 - .1 Purpose designed barbed nails for power nailing; in accordance with NFMA - Installing Hardwood Flooring installation manual and as recommended by flooring manufacturer.
 - .2 Nails: purpose designed barbed nails for power nailing; 25 mm (1") for second layer of sheathing to first layer, or longer as recommended by flooring manufacturer.
 - .3 Staples: 47 mm (1-7/8") Bostich staples for installation of hardwood, and as recommended by flooring manufacturer.
- .10 Bronze transition strip: Domus Engineering 3 mm (1/8") brass strips, various heights to match flooring conditions as indicated, as distributed by Olympia Tile.

2.3 Floor Finish System

- .1 Sand and prepare wood floor in accordance with NFMA methods.
- .2 Floor Finish System (4 coat):
 - .1 Non-yellowing, fast-curing (2-3 hour recoat time depending on site conditions), clear and colourless, Gloss finish, VOC compliant (not exceeding 350 gm/l), nonflammable with non-offending odour, water clean-up.
 - .2 Sealer: Bona 'Sport Seal' as manufactured by Bona US or approved alternate.
 - .3 Finish: Bona 'SuperSport' as manufactured by Bona US or approved alternate.

PART 3 - EXECUTION

3.1 Examination

- .1 Examine the existing conditions and ensure surface variations do not exceed 3 mm (1/8") in 3000 mm (1/8" in 9.84').

3.2 Preparation

- .1 Comply with recommendations of ASTM F710-08 and to NOFMA-accepted methods
- .2 Ensure floor surfaces are smooth, clean and cured, with trowel finish, free from curing compounds or surface coatings, in accordance with manufacturer's printed installation instructions.
- .3 Remove coatings, dirt and foreign matter, excessive dusting, broken or loose concrete, and moisture.
- .4 Grind off any high spots and fill cracks, fissures and depressions in concrete with levelling compound. Trowel smooth and level with surrounding surfaces and allow to dry and set. Prohibit traffic until compound has cured.

Wood Flooring

- .5 Where wood flooring adjoins thicker floor materials, apply patching compound, feathered out to make up difference in level between materials.

3.3 Installation - Plywood Underlay Direct Screw-Down

- .1 Vapour barrier:
 - .1 Cover substrate with vapour barrier membrane, allowing enough membrane to extend under baseboards.
 - .2 Use sheets of largest practical size to minimize joints.
 - .3 Lap joints 150 mm (6") and seal with lap sealant.
- .2 Plywood substrate:
 - .1 Loose lay 19 mm (3/4") plywood panels over entire floor area. Lay plywood on a diagonal to the direction of the finished floor, joints staggered 1220 mm (48").
 - .2 Leave 19 mm (3/4") space along perimeter wall lines and 6 mm (1/4") to 13 mm (1/2") between panels.
 - .3 Cut plywood to fit within 3 mm (1/8") near and around door jambs and other obstructions where finish trim will not be used.
 - .4 Fasten plywood with screws at 300 mm (12") on centre and 100 mm (4") from perimeter, minimum 32 fasteners per 1220 mm x 2440 mm (4' x 8') sheet. Machine screw plywood to substrate, starting at center of plywood panel and working toward edges to flatten out plywood.
- .3 Wood flooring; nail-down method:
 - .1 Install wood flooring in accordance with NOFMA - Installing Hardwood Flooring installation manual.
 - .2 Install wood flooring parallel with length of room.
 - .3 Machine nail or staple flooring to plywood underlay in accordance with NOFMA - Installing Hardwood Flooring installation manual and as recommended by flooring manufacturer.
 - .4 Offset end joints 300 mm (12"). Make side and end joints hairline in appearance.
 - .5 Maintain tight joints and board ends. Install to manufacturers written instructions.
 - .6 Maintain minimum 19 mm (3/4") expansion space at perimeter of floor surface at permanent obstructions, unless otherwise indicated or recommended by flooring manufacturer.
 - .7 Install transition strips at openings and where indicated. Attach transition strips to adjacent rigid floor surface. Transition strip to bridge floor surfaces over expansion space.
 - .8 Notch flooring around electrical floor boxes leaving a constant joint within 1.6 mm (1/16") tolerance.

3.4 Installation - Glue-Down

- .1 Install wood flooring in accordance with manufacturer's printed installation instructions.
- .2 Allow wood flooring and adhesive to warm up to room temperature for 24 hours before application.

Wood Flooring

- .3 Maintain a temperature of not less than 18°C nor more than 30°C in the installation area, during installation and for 72 hours thereafter.
- .4 Wood flooring installation:
 - .1 Glue-down method:
 - .1 Trowel with proper notch, 4.7 mm (3/16") wide, 6 mm (1/4") deep, 12.7 mm (1/2") on centre, or according to adhesive manufacturer's recommendation.
 - .2 substrate preparation: concrete substrate to be free of wax or other coatings.
 - .3 Thoroughly clean substrate. Unlevelness, such as carpet adhesive, trowel marks, waviness, and the like, are to be ground off or levelled with levelling compound.
 - .4 Follow instructions on the adhesive container and follow the manufacturer's recommendations. Start with tongue against the wall in order to avoid pushing glue inside of groove.
 - .5 Following installation, roll entire floor area with minimum 70 kg (150 lb) floor roller to ensure proper bonding.
 - .5 Apply adhesives in accordance with manufacturer's instructions.
 - .6 Lay flooring in direction as indicated.
 - .7 Notch flooring around posts, step lights, electrical floor boxes and penetrations, leaving a constant joint within 1.6 mm (1/16") tolerance.
 - .8 Provide maximum 9.5 mm (3/8") expansion space at perimeter of wood flooring surface, unless otherwise indicated and except as follows:
 - .9 Install trim and transition strips per manufacturer's installation instructions.

3.5 Wood Floor Finishing

- .1 Sand and prepare wood floor to MFMA-accepted methods and in accordance with floor finish manufacturer's recommendations. Use at least three passes, plus screening.
- .2 Apply floor finishing products in accordance with manufacturers specifications.
- .3 Vacuum floor thoroughly, and tack with slightly waterdampened 'Bona Mop' or cloth, immediately prior to finishing. Allow to dry (at least 30 minutes).
- .4 Apply sealer and screen sealer with 120 grit screen.
- .5 Sweep, pad, and tack. Allow to dry (at least 30 minutes).
- .6 Mix finish system components (including crosslinker) in strict accordance with manufacturer's printed directions. Do not adulterate finish system.
- .7 Apply 4 coats of floor finish to match approved mock-up, at coverage rate of 46-55 m²/L (500-600 ft²/per gallon).
- .8 Allow floor finish to cure thoroughly before permitting traffic (at least 7 days). Abrade floor finish between coats when allowed to cure longer than 48 hours between coats.
- .9 Apply floor finishing system to provide a premium quality, smooth and consistent finish free of imperfections, dust or lint particles, and scratches or abrasions.

Wood Flooring

3.6 Protection

- .1 Prevent traffic to floor finishing materials to printed direction of manufacturer.
- .2 Traffic is prohibited on floor finish coats for a period of 48 hours minimum, with only light traffic permitted up to 7 days. Until floor is fully cured (7 days minimum), traffic over floor finish is discouraged, including the application of protection sheets.
- .3 Do not use protection materials which will damage floor finish, such as plastic film, rosin paper, non-breathable membranes, and the like, to recommendations of manufacturer.
- .4 Do not use cleaning compounds until floor finish is fully cured.

END OF SECTION

Resilient Base

PART 1 - GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 Section Includes

- .1 Resilient base.

1.3 Quality Assurance

- .1 Qualifications: *Provide* work of this section, executed by competent installers with minimum 5 years experience in application of *Products*, systems and assemblies specified and with approval and training of *Product* manufacturers.

1.4 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 LEED submittals:
 - .1 Submit LEED submittals in accordance with Section 01352, 01359 and 01611.
 - .2 Submit documentation to verify compliance with LEED objectives and requirements.
- .3 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .4 Samples:
 - .1 Submit 3 - 305 mm (12") long samples of each colour and type of base material. Include outside corner of base.
- .5 Closeout submittals:
 - .1 Submit closeout submittals in accordance with Section 01770.
 - .2 Maintenance data:
 - .1 Submit maintenance instructions for inclusion in the maintenance manuals.
 - .3 Maintenance materials:
 - .1 Deliver 2% of each colour, pattern and type of resilient accessory required for this project for maintenance use. Store where directed. Clearly identify each box.
 - .2 Maintenance materials to be same production run as installed materials.

1.5 LEED Requirements

- .1 Comply with the requirements of Sections 01352, 01355, 01359, and 01611, as applicable.
- .2 Waste management and disposal:

Resilient Base

- .1 Comply with the waste management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01355. Comply with the directions of the *Contractor's* LEED coordinator with regard to waste management and disposal activities.
- .3 Construction indoor air quality (IAQ) management:
 - .1 Comply with the IAQ management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01359. Comply with the directions of the *Contractor's* LEED coordinator with regard to IAQ management activities.
- .4 Recycled Content and Regional Materials:
 - .1 Wherever possible, materials used in work of this Section are to contain high amounts of recycled content and are to be sourced regionally from within 800 km via truck or 2400 km via rail or ship from jobsite in accordance with Section 01611.

1.6 Environmental Requirements

- .1 Temperature of room and materials shall be at least 18°C for 24 hours before, during and 7 days after the installation of resilient accessories.

1.7 Warranty

- .1 Warrant work of this section for a period of 2 years, in accordance with Section 01780.

PART 2 - PRODUCTS

2.1 Materials

- .1 Acceptable manufacturers:
 - .1 Amtico.
 - .2 Burkemercer.
 - .3 Johnsonite.
- .2 Resilient base types:
 - .1 Vinyl base (for carpet): TightLock Carpet Wall Base, as manufactured by Johnsonite, 114.3 mm (4-1/2") high with a 108 mm (4-1/4") face surface, in a 6.3 mm (1/4") tapered wedge thickness.
 - .1 Colour: to later selection by *Consultant* from manufacturer's full range.
- .3 Resilient leveller strip and level strip extension system: LS Series, as manufactured by Johnsonite, sized to suit condition.
- .4 Block wall filler: Latex filler, "Planicrete AC" by Mapei Canada Ltd., "43 Thin-Set Mortar Additive and 53 Floor Mix" by Flextile Ltd. or waterproof filler recommended by flooring manufacturer.
- .5 Adhesive: Low VOC adhesive, as recommended by manufacturer, maximum VOC limit of 50 g/L (1.8 oz/gal).
 - .1 Porous wall surfaces: Johnsonite #960 Wall Base adhesive.
 - .2 Non-porous wall surfaces (i.e.: metal, epoxy paint, ceramics): Johnsonite #945 Contact Bond adhesive.

Resilient Base

- .6 Sealant: clear silicone, as manufactured by Tremco, CGE, or Dow Corning, maximum VOC limit of 70 g/L (2.5 oz/gal).

PART 3 - EXECUTION

3.1 Examination

- .1 Examine substrate to ensure clean lines, correct level and freedom from cracks, ridges, dusting, scaling and carbonation.
- .2 Examine walls in advance of application of base to ensure that surfaces are protected against entry of water and moisture. Perform compatibility test with primer/adhesive and substrate.

3.2 Installation of Resilient Base

- .1 Allow coiled wall base to lay flat for at least 24 hours at 18°C prior to installation, and maintain this temperature during installation.
- .2 Begin installation after adjacent work has been completed at walls and overhead areas.
- .3 Spread adhesive to the ribbed surface (back) of the wall base with a 3 mm (1/8") square-notched trowel; allow slight set-up, then bring base into contact. Ensure full and secure adhesion of base to substrate. The adhesive should cover 80% of the back surface. Leave a 6 mm (1/4") uncovered space at the top of the wall base to prevent the adhesive from oozing onto the wall above the base when installed.
- .4 Position wall base on wall surface and roll with hand roller. Always roll back to starting point to prevent stretching the wall base.
- .5 Set base to ensure installation over finished flooring material is free of gaps.
- .6 Install base in longest lengths possible, minimum 2440 mm (8'). Adhere toe of base to substrate, and ensure edge of toe is straight.
- .7 Install straight and level to variation of 1:1000.
- .8 At outside corners apply epoxy adhesive and chamfer. Round off with fine grade sandpaper. Remove any scratches or scuffs with paste wax.
- .9 Install base to substrate as scheduled and/or detailed and in accordance with manufacturer's recommendations.
- .10 Ensure that substrate is solid and free of voids, gaps, or other defects which will preclude adequate adhesion, or will ghost or telegraph through finished base installation.
- .11 Scribe and fit to door frames and other obstructions.
- .12 Joints shall be tightly fitted, straight and vertical, and not less than 610 mm (24") from corners.
- .13 Provide joints in base over substrate control joints.
- .14 Field-made inside corners:
 - .1 Install wall base and terminate into the corner.
 - .2 Position another piece of wall base on opposing wall, without adhesive, approximately 25 mm (1") from the installed piece.

Resilient Base

- .3 Utilizing the dividers, place the hooked end at the top of the installed piece and the pointer end on the top of the uninstalled piece. Carefully, move the dividers downward in a straight vertical motion, allowing the hooked end of the dividers to follow the profile of the installed piece. At the same time, place adequate pressure on the pointer end to transfer and/or scribe the profile onto the surface of the uninstalled piece.
- .4 Use a utility knife to cut the pattern on the uninstalled wall base, apply adhesive, and position the trimmed section into place.
- .15 Field-made outside corners:
 - .1 Stop application of adhesive to wall base approximately 450 mm (18") from the outside corner of the wall.
 - .2 Position the wall base at the corner and pencil line the back of the wall base where the bend is desired.
 - .3 Lay the wall base on the floor with the back up. Utilizing a top-set or pull-type gouge tool, make a shallow notch along the pencil line.
 - .4 Notch depth should not exceed one-quarter the total thickness of the wall base.
 - .5 Reposition the wall base corner on the wall. The corner of the wall should fit snugly into the notched recess on the back of the wall base.
 - .6 Apply adhesive and roll firmly into place.

3.3 Cleaning

- .1 Remove any excessive adhesive from surfaces of the base as work progresses in manner described by manufacturer. Remove wet adhesive with a water dampened cloth. If adhesive has dried, use a cloth dampened with mineral spirits.
- .2 Wash surfaces using non-phosphate detergent to remove silicone, wax, dirt and dust using rotary scrubbing machines fitted with nylon brushes. Wash with neutral mild detergent and water, thoroughly buff dry with smooth wool pad. Do not apply any other compounds.

END OF SECTION

Resilient Stair Treads, Risers, and Landings

PART 1 – GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 Section Includes

- .1 Resilient stair treads.
- .2 Resilient risers.
- .3 Resilient landings.

1.3 Quality Assurance

- .1 Qualifications: *Provide* work of this section, executed by competent installers with minimum 5 years experience in application of *Products*, systems and assemblies specified and with approval and training of *Product* manufacturers.
- .2 Conduct a pre-installation meeting in accordance with Section 01312.
- .3 Conduct quality control in accordance with Section 01450.
- .4 Products installed as part of the work of this section shall be from same production run.

1.4 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 LEED submittals:
 - .1 Submit LEED submittals in accordance with Section 01352, 01359 and 01611.
 - .2 Submit documentation to verify compliance with LEED objectives and requirements.
- .3 Samples:
 - .1 Submit samples of each pattern and colour of resilient stair tread, riser, stringer, and landing tile proposed for use in the *Work*.
- .4 *Product* data:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .5 Installation mock-up:
 - .1 Prior to commencing stair installation for this section, prepare full flight of stairs mock-up for acceptance by the *Consultant*.
 - .2 Do not proceed installation of work specified in this section until mock-up has been accepted by *Contractor* and *Consultant*.
- .6 Maintenance materials and data:
 - .1 Submit maintenance materials and data in accordance with Section 01770.
 - .2 Provide data for maintenance of rubber tile flooring for incorporation into maintenance manual.

Resilient Stair Treads, Risers, and Landings

- .3 Deliver 2% of each colour, pattern and type of rubber tile required for this project for maintenance use. Store where directed. Clearly identify each box.
- .4 Maintenance materials to be same production run as installed materials.

1.5 LEED Requirements

- .1 Comply with the requirements of Sections 01352, 01355, 01359, and 01611, as applicable.
- .2 Waste management and disposal:
 - .1 Comply with the waste management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01355. Comply with the directions of the *Contractor's* LEED coordinator with regard to waste management and disposal activities.
- .3 Construction indoor air quality (IAQ) management:
 - .1 Comply with the IAQ management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01359. Comply with the directions of the *Contractor's* LEED coordinator with regard to IAQ management activities.
- .4 Recycled Content and Regional Materials:
 - .1 Wherever possible, materials used in work of this Section are to contain high amounts of recycled content and are to be sourced regionally from within 800 km via truck or 2400 km via rail or ship from jobsite in accordance with Section 01611.

1.6 Environmental Requirements

- .1 Temperature of room and materials shall be at least 18°C and 21°C for 24 hours before, during and 7 days after the installation of resilient accessories.
- .2 In staircases that are exposed to intense or direct sunlight, *Products* shall be protected during the conditioning, installation, and adhesive curing periods, by covering the light source.
- .3 Concrete substrates shall be clean and smooth. Dust, scale, and loose particles must be removed, and the surface must be free of solvents, paint, grease, oil, wax, alkali, sealing/curing compounds, and any other foreign material that could affect adhesive bonding.
- .4 Concrete substrates shall be dry. Moisture content shall not exceed 1.6 kg/92.9 m² (3 lb/1000 ft²) in 24 hours, unless otherwise specified by manufacturer's printed literature. Test shall be in accordance with ASTM F1869-04. Testing shall be by independent inspection and testing company and in accordance with Section 01450.

1.7 Warranty

- .1 Warrant work of this section for a period of 2 years, in accordance with Section 01780.

PART 2 - PRODUCTS

2.1 Materials

- .1 Resilient stair treads, risers, and landings:

Resilient Stair Treads, Risers, and Landings

- .1 Typical: Johnsonite One-Piece Tread/Riser Combination Rubber Stair Treads with a round raised profile surface pattern, VIRTR for visually impaired with a 50 mm (2") wide carborundum strip of contrasting colour at nose.
- .2 At top riser of stairs: Johnsonite Roundel Rubber Stair Treads with a round raised rubber profile surface pattern, VIRH for visually impaired with a 50 mm (2") wide carborundum strip of contrasting colour at nose.
- .3 At landings: Johnsonite Roundel Rubber flooring with a round raised rubber profile surface pattern.
- .4 Colours: to later selection by the *Consultant* from the manufacturer's full range.
- .2 Adhesive: to suit on porosity of substrate, as approved by resilient stair tread manufacturer.
- .3 Sealant compound: clear silicone, as approved by resilient stair tread manufacturer.

PART 3 - EXECUTION

3.1 Examination

- .1 Examine substrate to ensure clean lines, correct level and freedom from cracks, ridges, dusting, scaling and carbonation.
- .2 Examine walls in advance of application of base to ensure that surfaces are protected against entry of water and moisture. Perform compatibility test with primer/adhesive and substrate.

3.2 Installation

- .1 Comply with manufacturer's printed installation specifications.
- .2 Trimming on both sides of the tread may be required to obtain proper pattern match to adjacent steps.
- .3 Install stair treads one piece for full width of stair. Adhere over entire surface and fit accurately. Install in accordance with manufacturer's specifications. Roll with 45 kg roller.
- .4 Nosing shall be tightly fitted against face of stairs. Open spaces at nose of stairs must be filled with epoxy sealant compound per manufacturer's instructions.
- .5 The stair tread and nosing portion of the stair tread shall be bonded directly to the step surface. Do not overlap the nosing over resilient riser material.

3.3 Cleaning

- .1 Remove any excessive adhesive from surfaces of treads, risers, landings, and stringers as work progresses in manner described by manufacturer. Remove wet adhesive with a water dampened cloth. If adhesive has dried, use a cloth dampened with mineral spirits.
- .2 Wash surfaces using non-phosphate detergent to remove silicone, wax, dirt and dust using rotary scrubbing machines fitted with nylon brushes. Wash with neutral mild detergent (pH of 7 - 8) and water, thoroughly buff dry with smooth wool pad. Do not apply any other compounds.

END OF SECTION

Vinyl Composite Tile Flooring

PART 1 - GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 Quality Assurance

- .1 Qualifications: Provide work of this section, executed by competent installers with minimum 5 years experience in application of *Products*, systems and assemblies specified and with approval and training of *Product* manufacturers.
- .2 Conduct a pre-installation meeting in accordance with Section 01312.
- .3 Conduct quality control in accordance with Section 01450.
- .4 Manufacturer's field review to be in accordance with Section 01450.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 LEED submittals:
 - .1 Submit LEED submittals in accordance with Section 01352, 01359 and 01611.
 - .2 Submit documentation to verify compliance with LEED objectives and requirements.
- .3 *Product* data:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .4 Samples:
 - .1 Submit 3 samples of each pattern and colour of vinyl composite tile flooring proposed for use in the work of this section.
- .5 Flooring installation mock-up:
 - .1 Prior to commencing flooring installation for this section, prepare full room mock-up (room size at least 10 m² (100 ft²) in area) for acceptance by the *Consultant*.
 - .2 Do not proceed flooring specified in this section until mock-up has been accepted by *Contractor* and *Consultant*.
- .6 Closeout submittals:
 - .1 Maintenance data:
 - .1 Submit maintenance data in accordance with Section 01770.
 - .2 Provide data sheets for maintenance of flooring for incorporation into maintenance manual.
 - .2 Maintenance materials:
 - .1 Submit maintenance materials in accordance with Section 01770.
 - .2 Deliver 2% of each color, pattern and type flooring material required for this project for maintenance use. Store where directed. Clearly identify each box.
 - .3 Maintenance materials to be same production run as installed materials.

Vinyl Composite Tile Flooring

1.4 LEED Requirements

- .1 Comply with the requirements of Sections 01352, 01355, 01359, and 01611, as applicable.
- .2 Waste management and disposal:
 - .1 Comply with the waste management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01355. Comply with the directions of the *Contractor's* LEED coordinator with regard to waste management and disposal activities.
- .3 Construction indoor air quality (IAQ) management:
 - .1 Comply with the IAQ management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01359. Comply with the directions of the *Contractor's* LEED coordinator with regard to IAQ management activities.
- .4 Recycled Content and Regional Materials:
 - .1 Wherever possible, materials used in work of this Section are to contain high amounts of recycled content and are to be sourced regionally from within 800 km via truck or 2400 km via rail or ship from jobsite in accordance with Section 01611.

1.5 Environmental Requirements

- .1 Install materials of this section only when surfaces and air temperatures have been maintained between 18°C and 32°C for 48 hours preceding installation, and will be so maintained during installation and for 48 hours thereafter. Maintain a minimum temperature of 13°C after above period.
- .2 Ensure that adequate ventilation is provided during installation and curing of materials of this section.
- .3 Ensure that spark-proof electrical equipment is provided, and smoking is prohibited, in areas where flammable adhesives are used. Store materials to prevent spontaneous combustion.
- .4 Concrete floors are to be dry, and exhibit negative alkalinity, carbonization, or dusting, and be free of curing/sealing compounds, residue from paint and adhesives.
- .5 Conduct the tests in accordance with ASTM F710-08 and the following:
 - .1 Test for moisture vapour transmission in accordance with ASTM F710-08 and ASTM F1869-04 or ASTM F2170-02 in accordance with manufacturer's written flooring installation instructions. Results must not exceed 170 µg/m² (3 pounds per 1,000 square feet) in 24 hours when tested to ASTM F1869-04, or exceed 75% when tested to ASTM F2170-02.
 - .2 Test for surface pH. Levels of pH shall not exceed the written recommendations of the flooring manufacturer and adhesive manufacturer. Test in accordance with ASTM F710-08.
 - .3 For each test type: Conduct 3 tests for flooring applications up to 93 m² (1000 square feet) in area, and 1 additional test for each additional 93 m² (1000 square feet) of flooring area.

Vinyl Composite Tile Flooring

- .4 Testing shall be conducted by independent inspection and testing company and in accordance with Section 01450.
- .6 In areas that are exposed to intense or direct sunlight, *Products* shall be protected during the conditioning, installation, and adhesive curing periods, by covering the light source.

1.6 Warranty

- .1 Warrant work of this section for a period of 2 years, in accordance with Section 01780.

PART 2 - PRODUCTS

2.1 Materials

- .1 Vinyl composite tile: to CSA A126.1-M1984; 3 mm thick x 305 mm x 305 mm (1/8" thick x 12" x 12").
 - .1 Pattern and colour to later selection by the *Consultant* from the manufacturer's full range, allow for up to 3 colours.
 - .2 Acceptable *Products*/manufacturers:
 - .1 Excelon Stonetex', as manufactured by Armstrong.
 - .2 Or approved alternate.
- .2 Primers and adhesives: water resistant recommended by flooring manufacturer for specific material on applicable substrate, above, at or below grade.
- .3 Substrate filler; minor patching and filling: white premix latex requiring water only to produce cementitious paste.
- .4 Epoxy levelling compound and screed; major patching and levelling: Chembond 'Chem-Epoxy 9931' to ANSI A118.3-2008.
- .5 Sealer and polish: institutional grade as approved by manufacturer.
- .6 Transition strips; as required between adjacent flooring finishes: manufactured by Johnsonite or Mercer or Finercraft to suit conditions at the *Place of the Work* for smooth transition. Colour to later selection by *Consultant* from manufacturer's full range. Adhesive to be as recommended by manufacturer.
- .7 Floor access covers/drains: in accordance with Division 15.

PART 3 - EXECUTION

3.1 Examination

- .1 Examine substrate to ensure clean lines, correct level and freedom from cracks, ridges, dusting, scaling and carbonation.
- .2 Examine floors in advance of application of flooring to ensure that floors are protected against entry of water and moisture. Perform compatibility test with primer/adhesive and substrate.

3.2 Preparation

- .1 Comply with recommendations of ASTM F710-08.
- .2 Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

Vinyl Composite Tile Flooring

- .3 Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
- .4 Alkalinity and adhesion testing: Perform tests and proceed with installation only after substrates pass testing. Document tests performed and submit in writing to *Consultant*.
- .5 Fill cracks, holes, and depressions in substrates with trowel-applied levelling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- .6 Do not install floor coverings until they are same temperature as space where they are to be installed.
 - .1 Move floor coverings and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- .7 Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation.
- .8 Remove chalking and dusting from concrete surfaces with wire brushes.
- .9 Where flooring adjoins thicker floor materials, apply epoxy levelling screed, feather out to make up difference in level between materials.

3.3 Tile Flooring Application

- .1 Apply adhesive uniformly using recommended trowel in accordance with flooring manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .2 Lay flooring with joints parallel to building lines to produce symmetrical tile pattern. Border tiles minimum half tile width.
- .3 Install flooring to entire area indicated or scheduled, including coverplates occurring within finished floor areas. Maintain overall continuity of colour and pattern with pieces of flooring installed on cover plates. Tightly butt edges to perimeter of floor around cover plates and to cover plates. Do not install flooring to floor drains occurring within finished floor areas.
- .4 As installation progresses, roll tile with polished, clean 45 kg (100 lb) roller to ensure full adhesion. Telegraphing of adhesive marks not permitted.
- .5 Cut tile and fit neatly around fixed or excessively heavy objects.
- .6 Terminate flooring at centerline of door in openings where adjacent floor finish or colour is dissimilar.
- .7 Centreline of reducer strip should coincide with centreline of door.

3.4 Edge Protection

- .1 Protect exposed edges of flooring, where finished and unfinished areas adjoining, by means of a reducing strip butting to and flush with the finished surface of the flooring covering material and securely adhered to the substrate material.
- .2 Install reducing strips where flooring terminates. Set flush with adjacent floor finishes.

Vinyl Composite Tile Flooring

3.5 Cleaning and Polishing

- .1 Remove excessive adhesive from surfaces of the tile and base as Work progresses.
- .2 Protect laid flooring from construction traffic for a period of 4 to 7 days to allow flooring to bond firmly. At the end of this time, thoroughly clean all surfaces with a neutral detergent cleaner and single-disc floor machine approved by manufacturer of vinyl composite tile flooring materials, and apply 2 coats of sealer and 2 coats of polish.

3.6 Protection

- .1 Protect new floors from time of final set of adhesive until final inspection. Install suitable protection sheeting, lap joints of material by 150 mm (6") and seal with non-asphaltic tape.
- .2 Prohibit traffic on floor for 48 hours after installation. No heavy traffic, rolling loads, or furniture placement for 72 hours after installation.
- .3 Install floor protection in areas where other work, repairs and installation of equipment, and foot traffic will occur.

END OF SECTION

Resilient Athletic Flooring

PART 1 - GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 Section Includes

- .1 Resilient athletic flooring.
- .2 Game line paint.

1.3 Quality Assurance

- .1 Qualifications: Provide work of this section, executed by competent installers with minimum 5 years experience in application of *Products*, systems and assemblies specified and with approval and training of *Product* manufacturers.
- .2 Conduct a pre-installation meeting in accordance with Section 01312.
- .3 Conduct quality control in accordance with Section 01450. Independent inspection and testing company shall attend the pre-installation meeting.
- .4 Manufacturer's field review to be in accordance with Section 01450.

1.4 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 LEED submittals:
 - .1 Submit LEED submittals in accordance with Section 01352, 01359 and 01611.
 - .2 Submit documentation to verify compliance with LEED objectives and requirements.
- .3 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .4 Samples:
 - .1 Submit 3 – 300 mm x 300 mm (12" x 12") sample of each type, pattern, and colour of flooring specified.
- .5 Mock-up:
 - .1 Prior to proceeding with permanent installation, prepare a mock-up installation for review indicating method of each type of application, edge treatment and relationships to adjoining surfaces. Minimum area shall be 15 m² (161 ft²).
 - .2 Location of installation shall be determined by *Consultant*.
- .6 Closeout submittals:
 - .1 Maintenance data:
 - .1 Submit maintenance data in accordance with Section 01770.
 - .2 Provide data sheets for maintenance of flooring for incorporation into maintenance manual.

Resilient Athletic Flooring

- .2 Maintenance materials:
 - .1 Submit maintenance materials in accordance with Section 01770.
 - .2 Deliver 2% of each colour, pattern and type flooring material required for this project for maintenance use. Store where directed. Clearly identify each box.
 - .3 Maintenance materials to be same production run as installed materials.

1.5 LEED Requirements

- .1 Comply with the requirements of Sections 01352, 01355, 01359, and 01611, as applicable.
- .2 Waste management and disposal:
 - .1 Comply with the waste management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01355. Comply with the directions of the *Contractor's* LEED coordinator with regard to waste management and disposal activities.
- .3 Construction indoor air quality (IAQ) management:
 - .1 Comply with the IAQ management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01359. Comply with the directions of the *Contractor's* LEED coordinator with regard to IAQ management activities.
- .4 Recycled Content and Regional Materials:
 - .1 Wherever possible, materials used in work of this Section are to contain high amounts of recycled content and are to be sourced regionally from within 800 km via truck or 2400 km via rail or ship from jobsite in accordance with Section 01611.

1.6 Environmental Requirements

- .1 Install materials of this section only when surfaces and air temperatures have been maintained between 18°C and 32°C for 48 hours preceding installation, and will be so maintained during installation and for 48 hours thereafter. Maintain a minimum temperature of 13°C after above period.
- .2 Ensure that adequate ventilation is provided during installation and curing of materials of this section.
- .3 Ensure that spark-proof electrical equipment is provided, and smoking is prohibited, in areas where flammable adhesives are used. Store materials to prevent spontaneous combustion.
- .4 Concrete floors are to be dry, and exhibit negative alkalinity, carbonization, or dusting, and be free of curing/sealing compounds, residue from paint and adhesives.
- .5 Conduct the tests in accordance with ASTM F710-08 and the following:
 - .1 Test for moisture vapour transmission in accordance with ASTM F710-08 and ASTM F1869-04 or ASTM F2170-02 in accordance with manufacturer's written flooring installation instructions. Results must not exceed 170 µg/m² (3 pounds per 1,000 square feet) in 24 hours when tested to ASTM F1869-04, or exceed 75% when tested to ASTM F2170-02.

Resilient Athletic Flooring

- .2 Test for surface pH. Levels of pH shall not exceed the written recommendations of the flooring manufacturer and adhesive manufacturer. Test in accordance with ASTM F710-08.
- .3 For each test type: Conduct 3 tests for flooring applications up to 93 m² (1000 square feet) in area, and 1 additional test for each additional 93 m² (1000 square feet) of flooring area.
- .4 Testing shall be conducted by independent inspection and testing company and in accordance with Section 01450.
- .6 In areas that are exposed to intense or direct sunlight, *Products* shall be protected during the conditioning, installation, and adhesive curing periods, by covering the light source.

1.7 Warranty

- .1 Warrant work of this section for a period of 2 years, in accordance with Section 01780.

PART 2 - PRODUCTS

2.1 Materials

- .1 Acceptable *Products* systems:
 - .1 ROBBINS PULASTIC-ZS' by Gym-Con Ltd. (705) 728-2222 or Connor "Elastiplus" by Westpoint Sports Flooring & Equipment.
 - .1 Adhesive: A two-component polyurethane.
 - .2 Game Line Paint: Pigmented two-component polyurethane paint.
 - .3 Substitutions: Refer to Section 01250
 - .2 Primers and adhesives: low VOC type as recommended by flooring manufacturer.
 - .3 Substrate filler and levelling compound: as recommended by flooring manufacturer.
 - .4 Reducing strips; as required between adjacent flooring finishes: manufactured by Johnsonite or Mercer or Finercraft to suit site condition for smooth transition.
 - .5 Floor access covers/drains: in accordance with Division 15.

PART 3 - EXECUTION

3.1 Examination

- .1 Examine substrate to ensure clean lines, correct level and freedom from cracks, ridges, dusting, scaling and carbonation.
- .2 Examine floors in advance of application of flooring to ensure that floors are protected against entry of water and moisture. Perform compatibility test with primer/adhesive and substrate.
- .3 Before beginning installation, verify with flooring manufacturer that substrate is properly cured, clean and dry.
- .4 Verify with *Contractor*, and by visual inspection that no curing compounds and /or sealers have been applied to the concrete without prior approval of the flooring manufacturer/*Supplier*.

Resilient Athletic Flooring

3.2 Substrate Preparation

- .1 Ensure floor surfaces are smooth, clean and cured, with trowel finish, free from curing compounds or surface coatings, in accordance with flooring manufacturer's printed installation instructions.
- .2 Remove carpet adhesives, coatings, dirt and foreign matter, excessive dusting, broken or loose concrete, and moisture which would impair bond.
- .3 Substrate to be prepared in accordance with ASTM F710-08.
- .4 Fill cracks, grooves, voids and /or construction joints with levelling compound as approved by manufacturer. High spots on the floor shall be removed by grinding them down.

3.3 Flooring Application

- .1 Apply adhesive uniformly using recommended trowel in accordance with flooring manufacturer's written instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .2 Lay flooring with joints parallel to building lines to produce symmetrical tile pattern. Border tiles minimum half tile width.
- .3 Install in accordance with manufacturer's written installation instructions.
- .4 Install flooring to entire area indicated or scheduled, including coverplates occurring within finished floor areas. Maintain overall continuity of colour and pattern with pieces of flooring installed on cover plates. Tightly butt edges to perimeter of floor around cover plates and to cover plates. Do not install flooring to floor drains occurring within finished floor areas.
- .5 Apply game lines in accordance with manufacturer's installation instructions in design and colours as indicated.
- .6 Trim and fit neatly around fixed objects.
- .7 Terminate flooring at centerline of door in openings where adjacent floor finish or colour is dissimilar, unless otherwise indicated.
- .8 Remove any excessive adhesive from surfaces of the tile and base as work progresses.
- .9 Protect laid flooring from construction traffic for a period as recommended by manufacturer. At the end of this time, thoroughly clean all surfaces with a neutral cleaner as approved by manufacturer of flooring materials.
- .10 Protect floors from time of final set of adhesive until final inspection. Install suitable protection sheeting, lap joints of material by 150 mm (6") and seal with non-asphaltic tape.
- .11 Install floor protection in areas where work of other sections, repairs and installation of equipment, and foot traffic will occur.

3.4 Flooring Application

- .1 Install flooring in accordance with manufacturer's written installation instructions.
- .2 Mix and apply adhesive uniformly using recommended trowel in accordance with flooring manufacturer's written instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.

Resilient Athletic Flooring

- .3 Unroll granulated rubber base mat into freshly applied adhesive. Seams shall be in virtual contact with absence of compression fit.
- .4 Lay granulated rubber base mat with joints parallel to building lines to produce symmetrical pattern. Borders minimum half roll width.
- .5 Trim and fit neatly around fixed objects.
- .6 Remove any excessive adhesive from surfaces of flooring as work progresses.
- .7 Terminate flooring at centerline of door in openings where adjacent floor finish or colour is dissimilar, unless otherwise indicated.
- .8 Roll surface of base mat with a medium-size roller.
- .9 Mix and apply sealer uniformly using recommended trowel in accordance with flooring manufacturer's written instructions. Allow minimum 12 hours to cure.
- .10 Mix and uniformly apply 2 coats of pigmented polyurethane resin in accordance with flooring manufacturer's written instructions. Allow minimum 12 hours to cure for each coat.
- .11 Mix and apply pigmented two-component polyurethane top coat uniformly with lambs wool roller in accordance with flooring manufacturer's written instructions. Allow minimum 12 hours to cure.
- .12 Apply game lines in accordance with manufacturer's installation instructions in design and colours as indicated.
- .13 Protect flooring from construction traffic for a period as recommended by manufacturer. At the end of this time, thoroughly clean all surfaces with a neutral cleaner as approved by manufacturer of flooring materials.
- .14 Protect floors from time of final set of adhesive until final inspection. Install suitable protection sheeting, lap joints of material by 150 mm (6") and seal with non-asphaltic tape.
- .15 Install floor protection in areas where work of other sections, repairs and installation of equipment, and foot traffic will occur.
- .16 Protect finished flooring from damage until directed to remove protection by *Contractor* or at *Substantial Performance of the Work*. Take special measures when moving heavy loads or equipment on them.

3.5 Edge Protection

- .1 Protect exposed edges of resilient flooring, where finished and unfinished areas adjoin, by means of a reducing strip butting to and flush with the finished surface of the flooring covering material and securely adhered to the substrate material.
- .2 Install reducing strips where flooring terminates. Set flush with adjacent floor finishes.

END OF SECTION

Carpet Tile

PART 1- GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 References

- .1 The standards referenced in this section are to the following editions:
 - .1 Carpet and Rug Institute (CRI) 104 - 2002, Standard for Installation of Commercial Carpet.
 - .2 ASTM F710-05 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 - .3 ASTM F1869-04 – Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

1.3 Quality Assurance

- .1 Qualifications: *Provide* work of this section, executed by competent installers with minimum 5 years experience in application of *Products*, systems and assemblies specified and with approval and training of *Product* manufacturers.
- .2 Conduct a pre-installation meeting in accordance with Section 01312.
- .3 Conduct quality control in accordance with Section 01450.
- .4 Manufacturer's field review to be in accordance with Section 01450.
- .5 *Products* installed as part of the work of this section shall be from same production run.

1.4 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 LEED submittals:
 - .1 Submit LEED submittals in accordance with Section 01352, 01359 and 01611.
 - .2 Submit documentation to verify compliance with LEED objectives and requirements.
 - .3 Submit manufacture documentation confirming products meet or exceed the Carpet and Rug Institute's (CRI) Green Label Indoor Air Quality Testing Program to meet the requirements of LEED credit EQc4.3, as outlined in Section 01359.
- .3 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .4 Samples:
 - .1 Submit 3 samples of each type and colour of carpet and edge trim, for acceptance of colour and construction by *Consultant*. Obtain acceptance from *Consultant* prior to ordering material.
 - .2 Sample sizes:

Carpet Tile

- .1 Carpet tile: 500 mm x 500 mm (20" x 20") or full size of tile, whichever is greater.
- .2 Edge trim: 150 mm (6") lengths.
- .5 Mock-up:
 - .1 Prior to proceeding with permanent installation, prepare a mock-up installation for review indicating method of each type of application, edge treatment and relationships to adjoining surfaces. Minimum area shall be 15 m² (161 ft²).
 - .2 Location of installation shall be determined by *Consultant*.
- .6 Manufacturer's installation recommendations:
 - .1 Submit carpet and adhesive manufacturer's written installation recommendations for each type of substrate required.
 - .2 Identify trowel notch size and shape, and required adhesive coverage rates for each specified carpet material for installation of specified materials.
- .7 Layout drawings:
 - .1 Submit for review drawings of tile layout, pattern recognition of possible wear locations, ease of replacement and the location and type of accessories and other information and details pertaining to the installation of carpet tile.
- .8 Closeout submittals:
 - .1 Submit maintenance data and materials in accordance with Section 01770.
 - .2 Maintenance data:
 - .1 For each type of carpet *Product*, submit 2 copies of maintenance instructions. Maintenance program shall be prepared by manufacturer, with list of recommended cleaning companies.
 - .3 Extra stock:
 - .1 Carpet tile: 2% of each carpet colour and type specified, supplied in full size units.
 - .2 Suitably package for protection and storage, each identified with name of manufacturer and with its type, colour, dye lot and yardage. Note date.
 - .3 Tag and store where directed by *Owner*.
 - .4 Maintenance materials to be same production run as installed materials.

1.5 LEED Requirements

- .1 Comply with the requirements of Sections 01352, 01355, 01359, and 01611, as applicable.
- .2 Waste management and disposal:
 - .1 Comply with the waste management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01355. Comply with the directions of the *Contractor's* LEED coordinator with regard to waste management and disposal activities.
- .3 Construction indoor air quality (IAQ) management:

Carpet Tile

- .1 Comply with the IAQ management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01359. Comply with the directions of the *Contractor's* LEED coordinator with regard to IAQ management activities.
- .4 Recycled Content and Regional Materials:
 - .1 Wherever possible, materials used in work of this Section are to contain high amounts of recycled content and are to be sourced regionally from within 800 km via truck or 2400 km via rail or ship from jobsite in accordance with Section 01611.
- .5 Carpet and Rug Institute Certification:
 - .1 Carpet systems are to be certified in accordance with the Carpet and Rug Institute's (CRI) Green Label Indoor Air Quality Testing Program, as outlined in Section 01359.

1.6 Environmental Requirements

- .1 Protect carpet tile installation with other work to minimize damage and soiling of carpet tile during remainder of construction period.
- .2 Do not begin carpet tile installation until painting and finishing work are complete and ceilings and overhead work have been tested, approved, and completed.
- .3 Temperature and Humidity: Carpet tile must be installed when the indoor temperature is between 18-35 °C with a maximum relative humidity of 65%. If ambient temperatures are outside these parameters, the installation must not begin until the HVAC system is operational and these conditions are maintained at least 48 hours before, during and 72 hours after completion.
- .4 Concrete floors are to be dry, and exhibit negative alkalinity, carbonization, or dusting. Maximum percentage of moisture acceptable is 1.4 kg/93 m² (3 lb/1000 ft²) in a 24 hour period, unless otherwise specified by manufacturer's printed literature.
 - .1 Testing requirements:
 - .1 Test for moisture vapour transmission in accordance with ASTM F1869-04.
 - .2 Test for surface pH.
 - .3 For each test type: Perform 3 tests for flooring applications less than 186 m² (2000 square feet) in area, and 1 test per additional 93 m² (1000 square feet).
- .5 Concrete shall be prepared utilizing ASTM F710-08.
- .6 In areas that are exposed to intense or direct sunlight, *Products* shall be protected during the conditioning, installation, and adhesive curing periods, by covering the light source.

1.7 Warranty

- .1 Warrant work of this section for a period of 2 years, in accordance with Section 01780.

PART 2 - PRODUCTS

2.1 Carpet Tile

- .1 Acceptable manufacturers:

Carpet Tile

- .1 Interface.
- .2 Alternates to *Consultant's* approval. Alternates shall be submitted prior to Bid Closing. Submit alternates in accordance with Section 01250.
- .2 Carpet tile; requirements:
 - .1 Manufactured in registered facilities certified to ISO 9001:2000 Quality Management Standard and ISO 14001:2004 Environmental Management Systems.
 - .2 Radiant Panel: (ASTM E648-09a) Class 1.
 - .3 Smoke Density: (ASTM E662-09) ≤ 450 .
 - .4 Lightfastness: (AATCC 16 - E) ≥ 4.0 @ 60 AFU's.
 - .5 Static:
 - .1 Typical tile: (AATCC - 134) < 3.0 KV.
 - .2 Computer grade tile; computer rooms: (AATCC - 134) < 2.0 KV.
 - .6 Dimensional Stability: AACHEN Din 54318 $< .10\%$.
 - .7 Backing: consisting of 2 layers of thermoplastic vinyl composite material, reinforced with fibreglass, 40% fly-ash content.
 - .1 Reinforcement: Fiberglass reinforced.
 - .2 Backing thickness: 2.3 mm (0.090") ± 0.3 mm (0.010")
 - .3 Weight: 3,316 g/m² (117.0 oz/yd²) ± 113 g/m² (4.0 oz/yd²).
 - .4 Acceptable *Product*:
 - .1 Interface 'GlasBac'.
 - .5 Antimicrobial:
 - .1 (AATCC 138 Washed) (AATCC 174 Parts 2 & 3).
 - .2 Antimicrobial preservative, permanently incorporated into the backing precoat, effective at protecting carpet from a broad spectrum of mould, mildew, bacteria and odour-causing micro organisms.
 - .3 Acceptable *Product*: Interface 'Intersept'.
 - .8 Minimum recycled content:
 - .1 Minimum 40% post-industrial recycled content.
 - .9 Carpet for each carpet type to be from single manufacturer.
- .3 Carpet tile types:
 - .1 CPT1:
 - .1 Tile size: 500 mm x 500 mm x 7.2 mm (20" x 20" x 3/10") overall thickness.
 - .2 Installation pattern: Uni-directional.
 - .3 Construction: Tufted textured loop.
 - .4 Dye method: 100% solution dye.
 - .5 Acceptable *Product*:

Carpet Tile

.1 Interface 'Super Flor'.

.1 Colour: to later selection by *Consultant*.

2.2 Adhesives

- .1 Carpet tile adhesive: Pressure sensitive, low VOC, CRI certified, in accordance with carpet manufacturer's installation instructions.
- .2 Transition strip adhesive: Low VOC, CRI certified, in accordance with carpet manufacturer's installation instructions.

2.3 Miscellaneous Materials

- .1 Latex crack filler: Compatible with adhesive and recommended by carpet manufacturer.
- .2 Transition strips: tapered vinyl type as manufactured by Johnsonite or Finercraft to suit site condition for smooth transition. Colour to later selection by *Consultant* from manufacturer's full range. Adhesive to be as recommended by manufacturer.
- .3 Transition strips and edge trim: in accordance with manufacturers recommendations.

PART 3- EXECUTION

3.1 General Installation Requirements

- .1 Comply with CRI 104 - 2002 by applicable installation method.

3.2 Substrate Requirements

- .1 Area of work of this section shall be dry with other work generally completed in acceptable manner. Do not commence work in areas where materials emitting moisture are not thoroughly dry, or where illumination is not characteristic of final illumination.
- .2 Before making an adhesive-adhered installation, the *Contractor* must submit to the flooring contractor a written report on the vapour emission levels and the surface alkalinity of concrete substrate.
- .3 Grind smooth ridges and high spots in concrete surfaces to be carpeted.
- .4 Remove grease, and foreign matter from substrate by cleaning and scraping as necessary, and thoroughly clean with a commercial vacuum cleaner.
- .5 Fill cracks, fissures and depressions in concrete with latex emulsion filler compatible with adhesive. Surfaces shall be smooth and free from defects that may telegraph through surface of carpet.

3.3 Installation – General

- .1 Comply with manufacturer's written installation instructions.
- .2 Conditioning carpet tile: Allow carpet tile to relax in the installation area for a minimum of 24 hours at a temperature between 18-35°C. Carpet must be adequately protected from soil, dust, moisture and other contaminants.
- .3 Select the appropriate adhesive and trowel notch configuration recommended by the carpet, and adhesive manufacturers.

Carpet Tile

- .4 Spread adhesive uniformly over the substrate areas with an appropriate trowel, leaving ridges of sufficient height to achieve full and complete coverage of the substrate and carpet backing, including penetration into the carpet tile backing's deepest recesses.
- .5 Allow no traffic over installation until adhesives have fully cured.
- .6 Finish and adhere securely along the wall line; with a smooth, neat appearance where no wall base materials are indicated; and concealed beneath base materials where wall base materials are indicated. Base materials shall be installed after installation of carpet.
- .7 Extend carpet tile into recesses and closets and around fixtures and service devices.
- .8 Installed carpet shall be free from perceptible variance in colour, stains, baldness, tears, fraying, patchwork, and other defects detrimental to good performance and appearance.
- .9 Install carpet accurately fitted at perimeter of rooms, cut with precision at columns, door frames and at other obstructions. At columns and other penetrations, cut carpet with maximum possible coverage.

3.4 Installation

- .1 Install carpet tile to manufacturer's recommended installation instructions.
- .2 Install carpet tile in patterns as indicated.
- .3 Determine quadrants by grid line of area using standard tile laying methods, or use laser alignment.
- .4 Lay carpet tiles accurately and firmly along centre lines of selected quadrants. Follow with subsequent tiles within quadrant using 'stair-step' techniques.
- .5 As tiles are installed, frequently check all joints with fingers to ensure proper alignment. Do not install tiles that are out of alignment.
- .6 Measure out 11 carpet tiles to attain the cumulative space gained over 10 joints, which shall not exceed 6 mm (1/4"). Repeat frequently throughout installation.
- .7 Install adhesive continuously per manufacturer's directions.
- .8 Carefully butt tiles together, avoiding too much pressure which may cause peaks or buckles. Brush back face pile and tip tile into place to avoid pile being caught in joint. Anchor all cut tile and perimeter tiles with release adhesive.
- .9 Make cuts from backs of tiles using templates for fitting around columns, service cut-outs and the like.

3.5 Transition Trim

- .1 Coordinate transitions with work of other sections and install transition trim to transitions between carpet tile flooring and adjacent flooring.
- .2 Allow coiled vinyl material to lay flat for at least 24 hours at 21°C prior to installation.
- .3 Set to ensure installation is free of gaps.
- .4 Install in longest lengths possible.
- .5 Install straight to maximum allowable variation of 1:1000.
- .6 Scribe and fit to obstructions.

Carpet Tile

- .7 Fit joints tightly, straight and vertical as applicable and not less than 610 mm (24") from corners.
- .8 Cope mitre corners.

3.6 Installation of Transition Strips

- .1 Install transition strips in continuous lengths, to level, straight lines.
- .2 Install trim between carpet tile and adjacent floor finishes and terminations, in maximum lengths, straight or as detailed, in accordance with manufacturer's installation instructions.
- .3 Set trim to height as required to cover carpet backing and not protrude above carpet fibres. Review heights with *Consultant* not later than 5 days prior to installation.

3.7 Service Marking

- .1 *Provide* +/- 25 mm (1") diameter contrasting colour dots of broadloom carpet, inserted using a carpet punch to mark electrical and mechanical access panels in floors. *Provide* cut-out and carpet tile inserts to suit access panels.

3.8 Cleaning

- .1 After installation is completed, clean and vacuum carpet of dirt, dust and foreign materials. Remove spots with suitable spot remover, remove cuttings, vacuum carpet thoroughly using approved commercial type equipment and leave clean. Provide necessary commercial vacuum cleaning equipment.
- .2 Cover with protective membrane, lapping joints 100 mm (4") with adhesive tape.

END OF SECTION

Spray On Acoustical Treatment

PART 1 - GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 Section Includes

- .1 Sprayed cellulose fibre acoustical treatment.

1.3 Quality Assurance

- .1 Execute work of this section using a *Subcontractor* who has adequate plant, equipment and skilled workers to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past 5 years.
- .2 Regulatory Agencies: Materials and applied systems shall have full acceptance of authority having jurisdiction.
- .3 Conduct a pre-installation meeting in accordance with Section 01312.
- .4 Conduct quality control in accordance with Section 01450. Independent inspection and testing company shall attend the pre-installation meeting.
- .5 Single source responsibility: Use total system, encompassing equipment, fibre and adhesive as supplied and tested by manufacturer. No substitutions are acceptable.

1.4 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 LEED submittals:
 - .1 Submit LEED submittals in accordance with Section 01352, 01359 and 01611.
 - .2 Submit documentation to verify compliance with LEED objectives and requirements.
- .3 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the *Work*, including installation instructions. Maintain one copy of installation manual on site.
- .4 Submit manufacturer's written certification that *Products* proposed for use in the *Work* contain no asbestos, fibreglass or other man-made mineral fibres.
- .5 Mock-up:
 - .1 Apply product to area of not less than 10 m² (100 ft²) for approval by *Consultant*.

1.5 LEED Requirements

- .1 Comply with the requirements of Sections 01352, 01355, 01359, and 01611, as applicable.
- .2 Waste management and disposal:

Spray On Acoustical Treatment

- .1 Comply with the waste management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01355. Comply with the directions of the *Contractor's* LEED coordinator with regard to waste management and disposal activities.
- .3 Construction indoor air quality (IAQ) management:
 - .1 Comply with the IAQ management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01359. Comply with the directions of the *Contractor's* LEED coordinator with regard to IAQ management activities.
- .4 Recycled Content and Regional Materials:
 - .1 Wherever possible, materials used in work of this Section are to contain high amounts of recycled content and are to be sourced regionally from within 800 km via truck or 2400 km via rail or ship from jobsite in accordance with Section 01611.

1.6 Performance Requirements

- .1 NRC:
 - .1 1.00 in accordance with ASTM C423-08a.
- .2 Flame spread/smoke developed: <5/<5, Class 1, Class A when tested at a minimum of 125 mm (5") thickness in accordance with ASTM E84-09c/UL 723-08.
- .3 Bond strength; Tested at greater than 5 years in accordance with ASTM E736-00(2006):
 - .1 Not less than 1952 kg/m² (400 psf).
 - .2 Not less than 600 times its weight at 25.4 mm (1").
- .4 Non-corrosive in accordance with UMB-80.
- .5 Bond deflection; 150 mm (6") deflection in 3000 mm (10') span: no spalling or delamination in accordance with ASTM E759-92(2005).

1.7 Product Delivery, Storage and Handling

- .1 Deliver materials in original, unopened containers bearing name of manufacturer, product identification and reference to UL testing.
- .2 Store materials off ground, under cover and away from damp surfaces and keep material dry at all times.
- .3 Protect liquid adhesive from freezing.

1.8 Warranty

- .1 Warrant work of this section for a period of 2 years, in accordance with Section 01780.

PART 2 - PRODUCTS

2.1 Acceptable Products

- .1 K-13 Spray On Systems, manufactured by International Cellulose Corporation. Substitutions shall be considered in accordance with Section 01250.
 - .1 Colour: Standard, to later selection by *Consultant* from manufacturer's full range.

Spray On Acoustical Treatment

PART 3 - EXECUTION

3.1 Installation

- .1 Coordinate work with other sections whose work may be affected or have an effect on installation. Do not position ducts, piping, conduit or other suspended equipment until after the application of sprayed insulation.
- .2 Examine surfaces and report unsatisfactory conditions in writing to *Consultant*. Do not proceed until unsatisfactory conditions are corrected.
- .3 Provide masking, dropcloths, or other satisfactory coverings for all materials and surfaces which are not to receive insulation so as to prevent damage from overspray.
- .4 Inspect surfaces to receive spray insulation prior to application to determine if priming and sealing is required to ensure bonding or prevent discolouration caused by migratory stains. Prime accordingly.
- .5 Install according to manufacturer's printed recommendations, and common construction standards.
- .6 Apply sprayed acoustical material to an average thickness to achieve the specified NRC value.
- .7 Provide natural or mechanical ventilation continuously to properly cure the insulation. Follow manufacturer's recommendations for curing.

3.2 Clean-up

- .1 Clean up work area and leave in a condition acceptable to *Consultant*.

END OF SECTION

Painting

PART 1 – GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 Section Includes

- .1 Interior painting.
- .2 Exterior painting.

1.3 Extent of Work

- .1 Paint and finish "paintable" surfaces for area of the *Work* indicated in the *Contract Documents* except those exempt by the *Contract Documents*.
- .2 The following surfaces are considered "non-paintable" for purposes of this *Contract*. Omit painter's finishes from following items:
 - .1 Material and equipment furnished completely prime and finish painted by manufacturer;
 - .2 Internal surfaces of steel tanks and stacks;
 - .3 Sprayed fire-resistant materials;
 - .4 Exterior concrete including building walls, building floors and pavements, except as otherwise scheduled.
 - .5 Stainless steel, weathering steel, copper, bronze, chromium plate, nickel, anodized or lacquered aluminum, monel metal;
 - .6 Exposed insulation, glass, plastic, brick, stone, resilient floors, treads and bases, tile and hardware;
 - .7 Prefinished metals, unless required to be colour coded.
 - .8 Metallic and mastic insulation finishes;
 - .9 Abrasive material finishes on floors, stair treads, stair nosings and landings;
 - .10 Insulated electric cables;
 - .11 Machined parts of machinery and equipment.
 - .12 Concealed surfaces.

1.4 References

- .1 Canadian Painting Contractors Association Painting Specifications Manual, latest edition, available from the Ontario Painting Contractors Association (OPCA) and referenced herein as the OPCA Manual.
- .2 CAN/CGSB 85.100-93 Painting.

1.5 Quality Assurance

- .1 Comply with the requirements of the OPCA Manual and CAN/CGSB 85.100-93, except where more stringent requirements are specified.

Painting

- .2 Qualifications of Applicators: applicators shall have minimum of 5 years proven satisfactory painting experience of projects of similar size and class subject to *Consultant's* approval.
- .3 Field quality control shall be in accordance with Section 01450, as supplemented herein.
- .4 Following the pre-installation meeting, prepare sample room or area under the supervision of the paint manufacturer's representative based on recommendations and decisions made at the pre-installation meeting. The sample room or area selected shall include the finishing of all materials and surfaces specified and scheduled for the *Work*. The minimum sample area for each material and finish shall be as follows:
 - .1 Concrete block, concrete and gypsum board: 9.29 m² (100 ft²).
 - .2 Hollow metal doors and frames, wood doors and frames: 1 door and frame for each finish specified.
- .5 Upon completion and approval, sample finishes shall serve as a standard for the balance of the *Work*. Subsequent work carried out and not, in the *Consultant's* opinion, equal to the standard shall be repainted at no additional cost to the *Owner*.

1.6 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 LEED submittals:
 - .1 Submit LEED submittals in accordance with Section 01352, 01359 and 01611.
 - .2 Submit documentation to verify compliance with LEED objectives and requirements.
- .3 Association manual: submit copy of OPCA Manual, and maintain one copy at site office for reference.
- .4 Colours:
 - .1 Prior to beginning painting work, *Contractor* will be furnished with paint colour numbers and copies of colour schedule for surfaces to be painted. Colours will be selected by the *Consultant*.
- .5 Samples:
 - .1 Samples for initial selection:
 - .1 Submit manufacturer's color charts showing the full range of colors available for each type of finish-coat material indicated.
 - .2 Paint colours will be selected by *Consultant*, from manufacturer's full colour range including light and deep, dark tones. *Consultant* will furnish schedule showing where the various colours, gloss value and sheen of the finishes occur.
 - .3 *Consultant* shall have complete freedom in choice of colours in compiling colour schedule and will not necessarily select colours from standard colour charts of manufacturer whose *Products* have been approved for use. Allow for a maximum of 16 field colours and 16 accent colours.
 - .4 *Contractor* to provide 3 drawdowns of each selected colour for review by *Consultant*. *Contractor* to resubmit as required. Drawdown to be of specified colour, sheen, and paint formula for applicable surface.

Painting

- .2 Samples for verification:
 - .1 Submit samples of various finishes for *Consultant's* approval, at least 30 days before materials are required.
 - .2 Submit samples in triplicate on 200 mm x 305 mm (8"x 12") material of the same type as that on which the coating is to be applied.
 - .3 Where possible identify each sample as to *Project*, finish, formula, colour name, number, sheen name and gloss values, date and name of *Contractor* and painting *Subcontractor*.
 - .4 Resubmit as required until colours and gloss value are approved.
- .6 *Product* data and list of *Products*:
 - .1 Submit name of paint manufacturer whose *Products* are proposed for use in the *Work* along with a complete list of *Products* intended for use in *Work*, prepared by paint manufacturer. Indicate manufacturer's official certification that *Products* listed thereon are the top quality made by the company unless otherwise indicated herein.
 - .2 List shall indicate name of paint manufacturer, the catalogue number, grade, and quality of the *Products* proposed for use, and be correlated to the schedule furnished by the *Consultant*.
 - .3 List shall be accompanied by manufacturer's *Product* data sheets for each *Product* listed.
 - .4 *Products* delivered to the *Place of the Work* shall conform to the reviewed list of *Products*.
- .7 Mock-ups:
 - .1 Provide full finished mock-up installation of each paint colour, for indicated surfaces and mock-up size, showing colour and finish selected by *Consultant*, under lighting conditions matching final area lighting, for acceptance by *Consultant*. Locate at the *Place of the Work* as part of finished installation if accepted.
 - .1 Concrete block, concrete and gypsum board: 9.3 m² (100 ft²).
 - .2 Hollow metal doors and frames: 1 door and frame for each finish specified.
 - .2 Upon completion and approval, sample finishes shall serve as a standard for the balance of the work of this section. Subsequent work carried out and not in the *Consultant's* opinion equal to the standard shall be repainted without charge.
- .8 Extra materials:
 - .1 Provide two sealed containers, each of four litres (one gallon) capacity of each paint product in each colour used in the work for *Owner's* maintenance use. Containers shall be new, clearly labelled with manufacturer's name, type of paint, colour and colour number. Store at the *Place of the Work* where directed by *Owner*.

1.7 LEED Requirements

- .1 Comply with the requirements of Sections 01352, 01355, 01359, and 01611, as applicable.

Painting

- .2 Waste management and disposal:
 - .1 Comply with the waste management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01355. Comply with the directions of the *Contractor's* LEED coordinator with regard to waste management and disposal activities.
- .3 Construction indoor air quality (IAQ) management:
 - .1 Comply with the IAQ management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01359. Comply with the directions of the *Contractor's* LEED coordinator with regard to IAQ management activities.

1.8 Environmental Requirements

- .1 Conform to the OPCA Manual.
- .2 Areas shall be clean and dust free before painting is commenced.
- .3 Make thorough examination of the complete *Contract Documents* to determine intent, extent, materials, types of surfaces, and locations requiring painting and be fully cognizant of requirements.
- .4 Use sufficient clean drop cloths and protective coverings for full protection of floors, furnishings and work not being painted. Protect mechanical, electrical and special equipment and all other components of building which do not require painting from paint spotting and other soiling during painting process. Mask adjoining work adjacent to work being painted or carefully cut in without overlaps. Clean surfaces soiled by spillage of paint and paint spatters. If cleaning operations damage the surface, repair or replace damaged work without cost to the *Owner*.
- .5 Do not paint over dust, rust, scale, grease, moisture, scuffed surfaces or conditions otherwise detrimental to the formation of a durable paint film.
- .6 Be responsible for damage to the work of this section until the building is complete and accepted by the *Consultant*. In cases of damage, surfaces shall be cleaned and repainted to *Consultant's* approval.
- .7 Do not paint exterior surfaces at temperatures below 10°C for latex products and below 10°C for solvent based products, nor in rainy conditions or high humidity (maximum relative humidity shall be 85%). Avoid applying paint to surfaces when exposed to direct sunlight. Do not paint interior surfaces at temperatures under 10°C, nor on surfaces where condensation has or will form due to presence of high humidity and lack of proper ventilation.
- .8 Provide ventilation to remove odours, evaporating solvents and moisture.
- .9 Check moisture content of surfaces to be painted using electronic moisture meter approved by paint manufacturer, and *Consultant*, or other approved method. Maximum moisture contents shall be in accordance with manufacturer's recommendations and as follows:
 - .1 Concrete and concrete masonry: Maximum 12% to 14% for solvent coatings, and as recommended by manufacturer for water based coatings.
 - .2 Gypsum board and plaster: Maximum 12% to 14%.
 - .3 Wood: Maximum 15%.

Painting

1.9 Storage, Delivery, Handling and Protection

- .1 Deliver materials to the *Place of the Work* in sealed original containers with labels intact and store in space directed by *Consultant*. Keep stored materials covered at all times. The presence of any unauthorized material or containers for such at the *Place of the Work* shall be sufficient cause for rejection of all paint materials at the *Place of the Work* at that time.
- .2 Exercise extreme caution in the storage of materials to prevent fire or that may create fire hazards. Thinners and solvents shall be stored in CSA approved metal safety containers in accordance with governing fire and safety regulations.
- .3 In areas of storage protect floor and wall surfaces from paint drips. Protect floors with sheets or clean plywood or metal pans where mixing is being carried out. Post "No Smoking" signs in areas of storage and mixing and strictly enforce this requirement. Provide and maintain fire extinguishers, accessible in storage and mixing areas.
- .4 Leave storage areas clean and free from evidence of occupancy when these are required for intended use.
- .5 Keep waste rags in metal drums containing water and remove from the *Place of the Work* at the end of each *Working Day*.
- .6 Provide labels on each container, correlated to the reviewed list of *Products*, with the following information
 - .1 Name of title of *Product*.
 - .2 Manufacturer's stock number.
 - .3 Manufacturer's name.
 - .4 Contents by volume, for major pigment and vehicle constituents.
 - .5 Thinning instructions.
 - .6 Application instructions.

1.10 Warranty

- .1 Warrant work of this section for a period of 2 years, in accordance with Section 01780.
- .2 Throughout the warranty period, painting systems shall remain free from failure due to causes including: material failure; surface preparation less than that specified; and paint film thickness less than that specified, or when not specified, less than that coverage recommended by manufacturer.
- .3 Presence of any of following during the warranty period shall constitute failure: visible corrosion; film peeling, blistering, checking, scaling, embrittling or general film disintegration; and poor adhesion as determined by tape "peel-off" test procedures.

PART 2- PRODUCTS

2.1 Materials

- .1 Acceptable *Products*:
 - .1 Only *Products* listed in Chapter 5 of the OPCA Manual shall be used in the *Work*, unless explicitly specified otherwise.

Painting

- .2 Only *Products* from the following manufacturers shall be used in the *Work* unless explicitly specified otherwise:
 - .1 Benjamin Moore & Co. Limited.
 - .2 ICI (Glidden) Paints
 - .3 Para Paints Canada Inc.
 - .4 PPG Canada Inc. (Pittsburgh Paints)
 - .5 Pratt & Lambert Co.,
 - .6 Sherwin-Williams Canada Inc.
 - .7 Sico Coatings Inc.
- .2 Paints and coatings materials used within the weatherproofing system shall not exceed the VOC content limits of the following criteria.
 - .1 Interior paints and coatings: to following Green Seal GS-11 VOC limits:
 - .1 Flat coating type: 50 gm/L.
 - .2 Non-flat coating type: 100 gm/L.
 - .2 Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates: Green Seal Standard GC-03, Anti-Corrosive Paints.
 - .3 Clear wood finishes, floor coatings, stains, and shellacs applied to interior elements: South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings
- .3 Paints and coatings materials used to the exterior of the weatherproofing system shall not exceed the VOC content limits of the following criteria.
 - .1 Exterior paints coatings: Green Seal GS-11; to following Green Seal VOC limits:
 - .1 Flat coating type: 100 gm/L
 - .2 Non-flat coating type: 200 gm/L
- .4 Paint and coating materials for each system shall be *Products* of a single manufacturer.
- .5 Provide safe and adequate equipment, scaffolding, ladders, plant, tools, brushes, rollers, clean drop cloths and other items required for the completion of the work.
- .6 Ensure the proper use of proprietary materials in strict accordance with manufacturer's directions.
- .7 Undercoatings and primers shall be made for the purpose by the manufacturer of the finishing materials being used, or as approved by same.
- .8 Brushes, rollers, and the like shall be the best of their respective kinds, clean and suitable for the work.
- .9 Joint sealants: in accordance with Section 07900.

PART 3 - EXECUTION

3.1 Conditions of Surfaces

- .1 Prior to commencement of work of this section, thoroughly examine surfaces scheduled to be painted.

Painting

- .2 Check surfaces with electric moisture meter and do not proceed if reading is higher than 12-15% or as otherwise required by paint or coating manufacturer.
- .3 Check surfaces to determine if pH of surfaces meet manufacturer's requirements.
- .4 Inspect surfaces to be coated for gouges, marks, nibs, and other defects and properly prepare patching, filling, smoothing or other surface preparation necessary to ensure satisfactory finish.
- .5 Report in writing any condition adversely affecting this work.
- .6 Proceed with work only when surfaces and conditions are satisfactory. Remove dust, grease, rust, scale and extraneous matter, tool and machine marks and insects from all surfaces which could be detrimental to a satisfactory and acceptable finish.

3.2 Preparation

- .1 Prepare surfaces to receive paints and coating in accordance with Chapter 3 of the OPCA Manual.
- .2 Prepare existing surfaces to be repainted in accordance with Article 6.2 of CAN/CGSB 85.100-93.
- .3 Clean floors, adjacent surfaces and surfaces to be painted before work is commenced.
- .4 Before commencement of work, remove electric plates, surface hardware, canopies of lighting fixtures, and other escutcheons and appurtenances. Mask adjacent items that are not removable. Replace items removed, when paint is dry and clean them. Use cleaning methods that will not damage finish.
- .5 Use sufficient drop cloths and protective coverings for the full protection of work not to be painted or coated.
- .6 Keep waste rags in covered metal drums containing water and remove from building at end of each day.
- .7 Shut down motors, fans, and mechanical ventilation systems during spray painting. Shut down air intakes in affected areas and ventilate to exterior, when applying noxious smelling or VOC containing paints and coatings.
- .8 Exposed concrete and concrete block walls which are scheduled to be painted or sealed shall not be painted or sealed until the sealant has been applied at control joints and joints with hollow metal frames.
- .9 Materials shall be thoroughly mixed before application and applied without cutting or admixture except as indicated in writing by the manufacturer.
- .10 Metal:
 - .1 Clean unpainted and shop primed metal to provide satisfactory surfaces to receive overcoats and provide permanent adhesion of coatings. Remove rust and scale with emery paper and wire brushes. Prime bare metal, make good shop primed metal where abraded, feather out edges to make touch-up patches inconspicuous. Thoroughly clean metal surfaces including piping and ductwork of oil and grease with mineral spirits.
 - .2 Remove loose paint and scale from shop primed metal work.
- .11 Concrete and Masonry:

Painting

- .1 Thoroughly clean form oil, parting compounds, curing compounds and other incompatible materials from concrete surfaces.
 - .2 Thoroughly clean masonry and concrete surfaces to be painted free of mortar droppings, concrete spotter and extraneous matter.
 - .3 Check concrete and masonry surfaces to be painted for alkalinity with pink litmus paper or other recognized method. Where extreme alkalinity occurs (6.8 - 8.0 range) wash surface with tetra potassium solution where latex base paint is to be used and with zinc sulphate solution where oil base paints are to be used. Rinse with clean water and allow to dry thoroughly prior to application of primer.
- .12 Gypsum Board:
- .1 Ensure that gypsum board joints are smooth and board is clean and free of jointing compound spatter.
 - .2 Test surfaces for alkalinity with pink litmus paper or other recognized method.
- .13 Metal Surfaces; Galvanized:
- .1 Apply cold phosphate surface treatment to SSPC-PT2-82 to unpassivated zinc-coated metal.
 - .2 For passivated zinc-coated metal ("white rusted"), power wire brush or vigorously hand wire brush to scuff galvanize thoroughly, and solvent clean to SSPC-SP1-82(R2004).
 - .3 Prepare exterior exposed galvanized steel and galvanized steel at wet areas to SSPC-SP 7/NACE No. 4-07 – Sweep Blast.
- .14 Woodwork:
- .1 Sand, wipe off dust and grit before prime coat application. Putty nail holes and minimal cracks after primer has dried; sand between primer and top coats with No. 300 sandpaper and remove dust.

3.3 Application - Primers

- .1 Completely prime surfaces of exterior wood to receive paints or coatings.
- .2 Apply primer coats to steel and galvanized steel surfaces that have and have not received shop coat or primer.
- .3 Finish and back prime wood components prior to their installation.
- .4 When primer sealer is dry, touch up visible suction spots before the next coat is applied and do not proceed with the work until suction spots are sealed.
- .5 Use high-build type primer/sealers at glass mat finished gypsum board substrate.

3.4 Application

- .1 Apply to surfaces scheduled to be finished. Apply materials in accordance with manufacturer's printed directions.
- .2 Paint and coating finishes shall be free of defects in materials and workmanship affecting appearance and performance. Defects shall include but not be limited to improper cleaning and preparation of surfaces, entrapped dust and dirt, alligators, blisters, peeling, drips, runs, uneven coverage, misses, poor cutting in, improper use or application of materials.

Painting

- .3 Paint shall be applied by means of brushes, except for wall and ceiling surfaces that shall be applied by rollers.
- .4 *Consultant* shall have the right to prohibit the use of spray painting for such reasons during application as carelessness, poor masking or protective measures, drifting paint fog, disturbance to other trades or failure to obtain a dense even opaque finish.
- .5 Apply coats only when the previous coat is dry/cured, in accordance with manufacturer's printed installation instructions.
- .6 Apply materials evenly, in full coats free from brush and roller marks, sags, runs, crawls, ridges, and other defects. Completed paint or coating shall be uniform in finish, sheen, colour, and texture.
- .7 Areas exhibiting incomplete or unsatisfactory coverage shall have the entire plane painted. Where cutting and patching work has been performed, shall have the entire plane painted. Patching will not be acceptable.
- .8 Permit paint to dry before applying succeeding coats, touch up suction spots and prepare previous coats in accordance with manufacturer's printed instructions. Remove dust of sanding.
- .9 Arrange to have traffic barred from completed areas wherever possible or provide adequate protection to prevent contamination of paints or coatings with foreign substances.
- .10 Tint filler to match wood to receive clear finishes, where filler is required. Work filler well into grain and before it has set wipe excess from surface.
- .11 Prime woodwork designed for painting as soon as possible after woodwork is delivered to site. Prime surfaces of such woodwork, exposed and semi-exposed, before installation. Back-prime woodwork indicated to receive transparent finish with 1 coat of specified transparent finish reduced 25%.
- .12 Sand semi-gloss, medium and high gloss finishes lightly between coats. Sand and dust between each coat to remove defects visible from distance of 1.5 m (5 ft).
- .13 Reseal cut edges of wood doors and seal unfinished tops and bottoms of wood doors with 3 coats polyurethane sealer.
- .14 Finishes and number of coats indicated are the minimum required. Apply further coats until complete uniform coverage is achieved to suit paint products and colours.
- .15 Priming coat shall be colour toned lighter than second coat and the second coat shall be toned lighter than finish coat. Only the finish coat shall match the colour of the accepted samples.
- .16 Paint inside surfaces of light coves white unless otherwise indicated.
- .17 Grilles and perforated items shall be spray painted. Do not block perforations and apply evenly to present consistent appearance free from defects visible from distance of 1.5 m (5 ft)
- .18 Do not apply paints and coating over fire rating labels.
- .19 Do not apply paints and coatings over identification labels on mechanical and electrical equipment.

Painting

- .20 Paint removable and operable items, such as access panels and doors, grilles, and similar items, while the item is removed or open, so as to not create a paint seal at the juncture of the opening or removable item and its fixed frame or substrate.
- .21 Keep sprinkler heads, fire detection equipment, and smoke detection equipment free of paint.
- .22 Repaint existing surfaces and finishes where scheduled, where alterations or renovations have been carried out, and where surfaces have been disturbed by the alterations or renovations. Repaint surfaces entirely between changes of plane.
- .23 Paint both sides and edges of plywood backboards for equipment before installation.

3.5 Mechanical and Electrical Items

- .1 Finish paint primed mechanical and electrical items with 2 coats of paint. Include for the following list unless otherwise indicated:
 - .1 Air handling units
 - .2 Convectors
 - .3 Conduit
 - .4 Diffusers
 - .5 Ductwork
 - .6 Grilles
 - .7 Hangers
 - .8 Heaters
 - .9 Fire hose cabinets
 - .10 Fire extinguisher cabinets
 - .11 Louvres
 - .12 Radiators
 - .13 Stacks
 - .14 Vents
- .2 Prime and paint exposed insulated and bare pipes. Prime and paint exposed conduits and electrical raceways, fittings, outlet boxes, junction boxes, pull boxes and similar items. Use heat resistant epoxy paint on pipes and surfaces where operating surface temperature exceeds 65°C.
- .3 Coordinate the painting of pipes, and coverings with mechanical contractor applying colour banding, flow arrows and pipe identification after the painting of pipes and coverings.
- .4 Paint work to match adjacent walls and ceilings unless directed otherwise.
- .5 Paint interior surfaces of air ducts and pipe trenches including heating pipes and elements that are visible through grilles and louvres with one coat of flat metal paint to limit of sight-line. Paint to be black or white as directed by *Consultant*.
- .6 Gas pipes, whether concealed or exposed, shall be painted in yellow-orange colour, in accordance with gas code.

Painting

- .7 Paint and finish wall surfaces behind convectors. Walls to be finished prior to installation of convector covers. Touch up walls after covers are installed as necessary to make good installation damage.
- .8 Air diffusers shall be primed and finished with 2 coats of paint of same colour and sheen as ducts and/or ceiling.

3.6 Patching

- .1 Do retouching to ensure that the work is handed over to the *Owner* in proper condition, free of runs, spatter, finger marks, rust, watermarks, scratches, blemishes or other disfiguration, with full, even coverage.
- .2 After fully painting, retouching and finishing a room or area, notify *Consultant*. After review and acceptance by *Consultant*, post sign "Painting Complete - No Admittance Without Permission".

3.7 Cleaning

- .1 Promptly as the work proceeds and on completion of the work, remove paint where spilled, splashed or spattered during the progress of the work keep the premises free from unnecessary accumulation of tools, equipment, surplus materials and debris; at the conclusion of the work leave the premises clean.

3.8 Schedules

- .1 Finish Schedule:
 - .1 Assume full responsibility for painting and varnishing of all materials of the contract exposed in the finished work which do not already have finished surfaces and that normally require paint or varnish finish. Inspect surfaces over which the work of this section is dependent for unevenness, cracks, surface defects, moisture, cleanliness, roughness and other irregularities detrimental to the application and performance of the work. Confirm conditions satisfactory before proceeding. Failure in complying with above or failure to have unsatisfactory conditions corrected before proceeding, shall not relieve *Contractor* of responsibility for required results.
 - .2 Exposed means visible in complete work including interiors of cupboards and closets, tops of doors, trim, and the like, whether in sight line or not, including behind surface mounted fixtures and heating units.
 - .3 In instances where materials specified are not suitable for particular application or are contrary to manufacturer's recommendations for use on particular surface, immediately bring to attention of *Consultant* for clarification and instructions.
 - .4 Where finishing formula for surfaces requiring paint is not specified, follow recommendations of OPCA Painting Specifications Manual as follows:
 - .1 Interior painting: Premium Grade.
 - .2 Exterior painting: Premium Grade.
 - .5 *Consultant* shall have right to make changes in colour tone of finishes prior to final coat to obtain desired results without additional cost to *Owner*.
 - .6 Unless otherwise noted or scheduled, walls shall be painted the same colour within a given area.

Painting

- .7 Access doors, prime coated butts and other prime painted hardware, registers, radiators and covers, exposed piping and electrical panels shall be painted to match adjacent surfaces in terms of colour, texture and sheen, unless otherwise indicated.

- .8 Gloss terms have following values in accordance with ASTM D523-08:

<u>Gloss Term</u>	<u>Gloss Units @ 60° Angle</u>
Level 1 - Matte	>0 to 5 Level
Level 2 - High-Sheen; flat, velvet	0 to 10 Level
Level 3 - Traditional Eggshell	10 to 25 Level
Level 4 - Satin	20 to 35 Level
Level 5 - Traditional Semi-gloss	35 to 70 Level
Level 6 - Traditional Gloss	70 to 85 Level
Level 7 - High Gloss	>85

3.9 Schedule - Interior Finishes

- .1 System references listed are based on Chapter 4B (Interior) of OPCA Manual and are Premium Grade, unless otherwise indicated:
- .1 Wood; Alkyd finish, INT. 1-A:
- .1 Gloss: Semi-Gloss
- .2 Use mildew resistant alkyd at window stools.
- .2 Plaster, Drywall (Gypsum Board); Alkyd finish, INT. 4-A:
- .1 Gloss:
- .1 Typical walls: Eggshell
- .2 Typical ceilings: Flat
- .3 Wet and Service Areas; walls and ceilings: Semi-Gloss
- .3 Concrete block; Tile-like epoxy (waterborne) finish, INT. 8-E:
- .1 Provide 2 blockfiller coats and 2 top coats.
- .2 Gloss: Eggshell
- .4 Concrete floors; Epoxy finish (2-component waterborne), INT. 9F:
- .1 Gloss: Semi-Gloss
- .5 Ferrous metals; 2-component Epoxy finish, INT.12-D:
- .1 Ferrous metal fabrications: Prepared and primed in accordance with Section 05500.
- .2 Gloss: Semi-Gloss

Painting

3.10 Schedule - Exterior Finishes

- .1 System references listed are based on Chapter 4A (Exterior) of OPCA Manual and are Premium Grade, unless otherwise indicated:
 - .1 Structural steel and steel fabrications; Alkyd finish, EXT. 11-A:
 - .1 Gloss: Semi-Gloss

END OF SECTION

Visual Display Surfaces

PART 1 - GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 Section Includes

- .1 Tackboards.
- .2 Marker boards (whiteboards).
- .3 Related trim, adhesives, and fastenings.

1.3 Quality Assurance

- .1 Erection of materials to be carried out by competent workers supervised by a foreperson with at least 10 years experience in this specialized field and approved in writing by manufacturer for installation of their *Product*.

1.4 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 LEED submittals:
 - .1 Submit LEED submittals in accordance with Section 01352, 01359 and 01611.
 - .2 Submit documentation to verify compliance with LEED objectives and requirements.
- .3 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .4 Samples:
 - .1 Submit 305 mm x 305 mm (12" x 12") samples of each *Product* specified, diagonally cut to show cross section through assembly, complete with accessories and trim.
- .5 Shop drawings:
 - .1 Show proposed system of anchorage and materials being supplied on shop drawings submitted for review.
 - .2 Show dimensional layouts, hardware items, anchorage devices, dimensions, description of materials and finishes, and all other pertinent information.
- .6 Closeout submittals:
 - .1 Submit closeout submittals in accordance with Section 01770.
 - .2 Maintenance data:
 - .1 Submit maintenance data for maintenance of *Products* for incorporation into maintenance manual.

Visual Display Surfaces

1.5 LEED Requirements

- .1 Comply with the requirements of Sections 01352, 01355, 01359, and 01611, as applicable.
- .2 Waste management and disposal:
 - .1 Comply with the waste management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01355. Comply with the directions of the *Contractor's* LEED coordinator with regard to waste management and disposal activities.
- .3 Construction indoor air quality (IAQ) management:
 - .1 Comply with the IAQ management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01359. Comply with the directions of the *Contractor's* LEED coordinator with regard to IAQ management activities.
- .4 Recycled Content and Regional Materials:
 - .1 Wherever possible, materials used in work of this Section are to contain high amounts of recycled content and are to be sourced regionally from within 800 km via truck or 2400 km via rail or ship from jobsite in accordance with Section 01611.
- .5 Composite wood, agrifibre products and laminate adhesives:
 - .1 Comply with the urea-formaldehyde requirements of section 01359 for composite wood, agrifibre products, and laminate adhesives.

1.6 Trademarks and Labels

- .1 No trademarks or labels will be accepted on exposed finished work.

1.7 Protection

- .1 During installation utmost care to be taken by workers to ensure the protection of the *Work* from damage by other trades until the building is ready for occupation and handed over to the *Owner*.
- .2 Protection of materials during the painting operation shall be carried out by the use of polyethylene covering which shall be the responsibility of the painting *Subcontractor*.

1.8 Warranty

- .1 The warranty period with regard to the *Products* of this section is 10 years, in accordance with section 01780.

PART 2 - PRODUCTS

2.1 Tackboards

- .1 Krommenie cork tackboard: 12.7 mm (1/2") factory prelaminated consisting of 6 mm (1/4") thick Forbo 'Bulletin Board' linoleum cork laminated to 6 mm (1/4") particle board substrate under mechanical pressure in maximum panel sizes of 1219 mm x 2438 mm (4'-0" x 8'-0"). Bonding of materials by a waterproof adhesive that will not delaminate or rupture at the contact surfaces.

Visual Display Surfaces

- .1 Colour of tackboard to be selected by *Consultant* from manufacturer's standard colour range.
- .2 Natural cork tackboard: 12.7 mm (1/2") factory prelaminated consisting of 6 mm (1/4") thick pure grain natural cork laminated to 6 mm (1/4") particle board substrate under mechanical pressure in maximum panel sizes of 1219 mm x 2438 mm (4'-0" x 8'-0"). Bonding of materials by a waterproof adhesive that will not delaminate or rupture at the contact surfaces. Elite reveal trim.
- .3 Aluminum trim: in accordance with paragraph 2.3 below.

2.2 Marker Boards (Whiteboards)

- .1 Porcelain enamel board with porcelain enamel writing surface on 0.8 mm (.03") (22 gauge) high quality enameling steel base, 11.1 mm (0.44") impregnated fibreboard core and 0.4 mm (0.02") (28 gauge) stretcher levelled zinc coated back sheet. Writing surface and back sheet laminated in one piece under mechanical or hydraulic pressure to core. Elite reveal trim and recessed marker rail.
 - .1 White colour writing surface, designed for long lasting heavy duty marker writing surface, free of permanent marker staining.
 - .2 Joints shall be absolutely flush and level, plumb true with edges finished square and fitted as closely as possible. Use concealed joint fasteners.
 - .3 Particle board backing to CAN3-0188.1-M78, 6 mm (1/4") thick, with sanded faces.
 - .4 Porcelain writing surface: 0.076 mm (0.003") thick porcelain enamel to Porcelain Enamel Institute Standards PEI /s104. Gloss factor: 6-8 as measured by 45° glossmeter.
 - .5 Concealed mechanical joining system: integral, slotted, PVC insert laminated into ends of panels and 25 mm (1") wide, 2 mm (0.08") thick, galvanized steel spline.
 - .6 Aluminum trim: in accordance with paragraph 2.3 below.
 - .7 Acceptable manufacturers:
 - .1 Architectural School Products (a.s.p.).
 - .2 Delta Products Ltd.
 - .3 Global School Products Inc.

2.3 Trim Components

- .1 Extruded aluminum components, AA6063 T5.
- .2 Tackboards:
 - .1 Aluminum trim and accessories:
 - .1 Perimeter.
 - .2 Divider Bar.
 - .3 Maprail.
 - .4 Chalktray.
- .3 Marker boards:

Visual Display Surfaces

- .1 Acceptable *Products*:
 - .1 Perimeter: ASP No. 505.
 - .2 Divider Bar: ASP No. 507.
 - .3 Maprail: ASP Kwikgrip Rail No. 500KG.
 - .4 Chalktray: ASP No. 521.

2.4 Fastenings

- .1 Reinforcing anchor plates to be galvanized steel plates conforming to CSA G4-00 (R2006).
- .2 Use screws, bolts of galvanized steel or aluminum.
- .3 Ferrous metal not specified must be plated or baked enamel and treated with primer conforming to CGSB 1-GP-140M.

PART 3 - EXECUTION

3.1 Examination

- .1 Prior to commencement of erection, check surfaces for irregularities, trueness and rigidity and projections and defects and immediately report in writing to *Contractor*.
- .2 Commencing installation implies acceptance of surface conditions.

3.2 Installation - Tackboards

- .1 Secured from behind and mounted in accordance with manufacturer's written instructions to satisfaction of *Consultant*.
- .2 Install secure, plumb and square.
- .3 Secure wall brackets to blocking in stud walls, or with zinc plated metal expansion type anchors at masonry back-up.
- .4 Locate seams as directed by *Consultant*.

3.3 Installation –Marker Boards

- .1 Install in accordance with manufacturer's written installation instructions.
- .2 Secure wall brackets to blocking in stud walls, or with zinc plated metal expansion type anchors at masonry back-up.
- .3 Join panels together by use of 14 gauge x 25.4 mm (1") wide steel spline and extruded polyvinyl slotted insert for flush butt joints, with a hairline appearance.
- .4 Erect units plumb, level and accurate.
- .5 Locate seams as directed by *Consultant*.

3.4 Installation – Trim Components

- .1 Install in accordance with manufacturer's written installation instructions.
- .2 Attach aluminum trim, where applicable, in such a manner that fastenings shall be concealed. Fastening shall be accomplished by the use of #10 x 25.4 mm (1") steel wood screws with rawl plugs, attached to walls.

Visual Display Surfaces

- .3 Erect units plumb, level and accurate.
- .4 Leave trim and surfaces clean and free of stains or marks and completely cover finished surfaces with "Pliofilm" immediately after installation and remove only at time of final inspection.

END OF SECTION

Metal Toilet Partitions Doors

PART 1 - GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 Section Includes

- .1 Toilet partitions doors

1.3 Quality Assurance

- .1 The work of this section shall be performed by a *Subcontractor* who is regularly engaged in the assembly and installation of toilet partition systems. *Subcontractor* shall demonstrate to the acceptance of the *Consultant*, that they have successfully performed on comparable projects over the previous 5 years.

1.4 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 LEED submittals:
 - .1 Submit LEED submittals in accordance with Section 01352.
 - .2 Submit documentation to verify compliance with LEED objectives and requirements.
- .3 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .4 Shop drawings:
 - .1 Show the proposed system of anchorage and materials being supplied on shop drawings submitted for review.
 - .2 Show hardware items, anchorage devices, dimensions, description of materials and finishes, and all other pertinent information.
- .5 Samples:
 - .1 Submit 3 samples of each colour of panel and samples of hardware items, and a typical base mounted sample of a pilaster and shoe.
- .6 Mock-up:
 - .1 *Provide* full scale washroom partition assembly to washroom location as designated by *Consultant*.
 - .2 Mock-up may be incorporated in the completed work upon acceptance of *Consultant*.
- .7 Maintenance data:
 - .1 Submit maintenance data for maintenance of work of this section for incorporation into maintenance manual in accordance with Section 01770.

Metal Toilet Partitions Doors

1.5 LEED Requirements

- .1 Comply with the requirements of Sections 01352, 01355, 01359, and 01611, as applicable.
- .2 Waste management and disposal:
 - .1 Comply with the waste management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01355. Comply with the directions of the *Contractor's* LEED coordinator with regard to waste management and disposal activities.
- .3 Construction indoor air quality (IAQ) management:
 - .1 Comply with the IAQ management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01359. Comply with the directions of the *Contractor's* LEED coordinator with regard to IAQ management activities.

1.6 Product Handling

- .1 Cover exposed stainless steel surfaces with protective masking.

1.7 Warranty

- .1 Warrant work of this section for a period of 2 years, in accordance with Section 01780.

PART 2 - PRODUCTS

2.1 Products – General

- .1 Toilet Partition doors: wall mounted doors.

2.2 Acceptable manufacturers:

- .1 Hadrian Manufacturing Inc.
- .2 Shanahan's Manufacturing Limited.
- .3 Global Partitions – Watrous Inc.

2.3 Materials

- .1 Sheet Steel: zinc coated steel, Galvanneal to ASTM A924/A924M-09 GR33, in following base steel thicknesses:
 - .1 Doors and panels: 0.8 mm (0.03") (22 gauge).
- .2 Pilasters: 32 mm (1-1/4") die formed stainless steel.
- .3 Fastenings: Chrome plated type.
- .4 Core: Honeycomb type, minimum compressive strength 213 kPa (31 psi), minimum cell size 25 mm (1").
- .5 Hardware:
 - .1 General: Hardware shall be heavy duty, chrome plated, non-ferrous metal castings in a high gloss finish. Chrome finish shall be high gloss uniform finish without discolourations, pits, marks or any other visual defects.

Metal Toilet Partitions Doors

- .2 Hinges: concealed casting, adjustable 15° door-open angle, self-lubricating, non-rising return movement.
- .3 Latch Set: Emergency entry built in, combination latch, door stop, keeper and bumper. *Provide* lever type thumbturn at barrier free stalls.
- .4 Wall and Connecting Brackets: Either continuous formed type or patch type metal to match finish of hinges.
- .5 Coat Hook: Combination coat hook and door keeper matching design of hinges with a neoprene rubber bumper.
- .6 *Provide* style and material matching door pulls for out-swinging doors.
- .7 Exposed Fasteners: Chrome plated screws and bolts of same material as hardware item being secured. Threaded inserts and T-nuts are acceptable for composite core construction.
- .8 Concealed Fasteners: Corrosion resistant zinc plated screws or bolts.
- .6 Steel Finish: Epoxy powder or enamel coated, alkali resistant paint finish shall have successfully passed ASTM B117-07a. Colour of finish to later selection by *Consultant* from the manufacturer's full range of colours.

2.4 Fabrication

- .1 Fabricate toilet partitions doors and compartments to layout dimensions shown.
- .2 Fabricate doors, panels and pilasters of sheet steel cemented under pressure to core material. Make pilasters 32 mm (1-1/4") thick; all other doors and panels, 25 mm (1") thick. Use only plywood cores for pilasters and panels on which grab bars are mounted.
- .3 *Provide* formed edges on doors, panels and pilasters. Weld edges together and seal with continuous oval crown locking strips with corners mitred, welded and ground smooth.
- .4 Conceal and protect floor fastening with die formed stainless steel pilaster shoe cap, complete with concealed hold-in-place clips. Exposed screws are not to be permitted.
- .5 Reinforce doors, panels and pilasters to accept hardware, tissue holders and fittings.
- .6 Reinforce pilasters and doors of barrier free cubicles to support the wider door without deformation.
- .7 Shop Finishing:
 - .1 Clean and phosphatize steel components.
 - .2 Continuously finish coat to manufacturer's standards, to smooth hard finish.

PART 3 - EXECUTION

3.1 Installation

- .1 General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
 - .1 Maximum Clearances:
 - .1 Pilasters and Panels: 12.7 mm (1/2").

Metal Toilet Partitions Doors

- .2 Panels and Walls: 25.4 mm (1").
- .2 Stirrup brackets: Secure panels to walls and to pilasters with no fewer than two brackets attached near top and bottom of panel.
 - .1 Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
 - .2 Align brackets at pilasters with brackets at walls.
- .3 Doors: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.
- .4 Install hardware components and enclosures with fastenings and screws to manufacturer's standard. Attach panel and pilasters to brackets with through type sleeve bolt and nut.
- .5 Hang doors, adjust hinges to perform as specified. Re-check doors for emergency feature.
- .6 Make good finished surfaces damaged during shipment or installation.

3.2 Adjustment and Cleaning

- .1 Hardware adjustment:
 - .1 Adjust hardware so that latches operate smoothly and without binding. Lubricate hardware if required by *Supplier's* instructions.
 - .2 Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.
- .2 Clean exposed surfaces using materials and methods recommended by manufacturer. Provide protection during remainder of construction period.

END OF SECTION

Service Walls

PART 1 - GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 LEED submittals:
 - .1 Submit LEED submittals in accordance with Section 01352, 01359 and 01611.
 - .2 Submit documentation to verify compliance with LEED objectives and requirements.
- .3 Samples:
 - .1 Submit duplicate samples of each finish specified.
- .4 Shop drawings:
 - .1 Clearly indicate fabrication details, plans, elevations, hardware, and installation details.
- .5 *Product* data:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .6 Templates:
 - .1 Submit templates for use by installers and fabricators as required for proper location and installation of hardware.
- .7 Maintenance data:
 - .1 Submit operation and maintenance data for incorporation into maintenance manual specified in Section 01770.

1.3 LEED Requirements

- .1 Comply with the requirements of Sections 01352, 01355, 01359, and 01611, as applicable.
- .2 Waste management and disposal:
 - .1 Comply with the waste management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01355. Comply with the directions of the *Contractor's* LEED coordinator with regard to waste management and disposal activities.
- .3 Construction indoor air quality (IAQ) management:
 - .1 Comply with the IAQ management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01359. Comply with the directions of the *Contractor's* LEED coordinator with regard to IAQ management activities.
- .4 Recycled Content and Regional Materials:

Service Walls

- .1 Wherever possible, materials used in work of this Section are to contain high amounts of recycled content and are to be sourced regionally from within 800 km via truck or 2400 km via rail or ship from jobsite in accordance with Section 01611.

PART 2 - PRODUCTS

2.1 Classroom Control Panels

- .1 Acceptable *Product*:
 - .1 'Classroom Control Panel' by WOLFEworks Design or Interspec.
 - .2 Substitutions: in accordance with Section 01250.
- .2 Description:
 - .1 Recessed installation, extruded satin anodized aluminum frame and fascia with knockouts and insert plates for services, ceiling access for wire drop/raceways.
 - .2 Finishes:
 - .1 Plastic laminate and matching baked enamel fasteners: colour to *Consultant's* selection.
 - .2 Framework and aluminum consoles: Clear anodized aluminum.
 - .3 Width: 400 mm (16")
 - .4 Depth: 100 mm (4")
 - .5 Clock: Model WT-3143A 14" Atomic Analog as distributed by Central Time Systems Co. Ltd.
 - .6 Phone: Provide recessed telephone tub.
 - .1 Telephone shall be supplied and installed by *Owner*.
 - .7 Provide aluminum console with provisions for light switches and thermostat.
 - .8 Provide aluminum console with provisions for receptacle and data outlet.
 - .9 P.A. Speaker Grille.
 - .10 P.A. Speaker Switch.
 - .11 Classroom light switches.

PART 3 - EXECUTION

3.1 Installation

- .1 Submit manufacturer's information and templates required for installation of work of this section, and assist or supervise, or both, the setting of anchorage devices, and construction of other work incorporated with *Products* specified in this section in order that they function as intended.
- .2 Install work to meet manufacturer's specifications and installation instructions, true, tightly fitted, and level or flush to adjacent surfaces, as suitable for installation.
- .3 Include reinforcing, anchorage and mounting devices required for the installation of each *Product*.

Service Walls

- .4 it joints and junction between components tightly and in true planes, conceal and weld joints where possible.
- .5 Fabricate *Products* with materials and component sizes, metal gauges, hardware, reinforcing, anchors, and fastenings of adequate strength to ensure that finished installation will remain free of warping, buckling, opening of joints and seams, and distortion within limits of intended use.

3.2 Adjustment and Cleaning

- .1 Verify under work of this section that installed *Products* function properly, and adjust them accordingly to ensure satisfactory operation.
- .2 Refinish damaged or defective work so that no variation in surface appearance is discernible.
- .3 Final cleaning shall be in accordance with Section 01770.

END OF SECTION

Corner Guards

PART 1 - GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 Section Includes

- .1 Corner guards.
- .2 Wall protection.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 LEED submittals:
 - .1 Submit LEED submittals in accordance with Section 01352, 01359 and 01611.
 - .2 Submit documentation to verify compliance with LEED objectives and requirements.
- .3 Samples:
 - .1 Submit 2 samples, 300 mm (12") long or 300 x 300 mm (12 x 12") in size as applicable, for each *Product* in specified finish.
- .4 Shop drawings:
 - .1 Submit shop drawings, and colour and finish samples for work of this section in accordance with Section 01330.
 - .2 Clearly indicate fabrication details, plans, elevations, hardware, and installation details.
- .5 Templates:
 - .1 Submit templates to *Contractor* for use by installers and fabricators as required for proper location and installation of hardware.

1.4 LEED Requirements

- .1 Comply with the requirements of Sections 01352, 01355, 01359, and 01611, as applicable.
- .2 Waste management and disposal:
 - .1 Comply with the waste management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01355. Comply with the directions of the *Contractor's* LEED coordinator with regard to waste management and disposal activities.
- .3 Construction indoor air quality (IAQ) management:
 - .1 Comply with the IAQ management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01359. Comply with the directions of the *Contractor's* LEED coordinator with regard to IAQ management activities.
- .4 Recycled Content and Regional Materials:

Corner Guards

- .1 Wherever possible, materials used in work of this Section are to contain high amounts of recycled content and are to be sourced regionally from within 800 km via truck or 2400 km via rail or ship from jobsite in accordance with Section 01611.

1.5 Delivery, Storage and Handling

- .1 Package or crate, and brace *Products* to prevent distortion in shipment and handling. Label packages and crates, and protect finish surfaces by sturdy wrappings.
- .2 Deliver *Products* to location at the *Place of the Work* designated by *Contractor*.

1.6 Warranty

- .1 Warrant work of this section for a period of 2 years, in accordance with Section 01780.

PART 2 - PRODUCTS

2.1 Corner Guard Protection

- .1 Refer to Room Finish Schedule.
- .2 Sealants: in accordance with Section 07900.

PART 3- EXECUTION

3.1 Installation

- .1 Install work to meet manufacturer's recommended specifications, true, tightly fitted, and level or flush to adjacent surfaces, as suitable for installation.
- .2 Clean substrates to remove dirt, debris and loose particles prior to installation.
- .3 Fit joints and junction between components tightly and in true planes.
- .4 Install units on solid backing as indicated, and erect with materials and components straight, tight and in alignment.
- .5 Corner guards:
 - .1 Adhere corner guards with continuous adhesive beads in accordance with manufacturer's written instructions.

END OF SECTION

Washroom Accessories

PART 1 - GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 Section Includes

- .1 Washroom accessories.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 LEED submittals:
 - .1 Submit LEED submittals in accordance with Section 01352, 01359 and 01611.
 - .2 Submit documentation to verify compliance with LEED objectives and requirements.
- .3 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .4 Samples:
 - .1 Submit duplicate samples of each finish specified.
- .5 Shop drawings:
 - .1 Clearly indicate fabrication details, plans, elevations, hardware, and installation details.
- .6 Maintenance data:
 - .1 Submit operation and maintenance data for incorporation into maintenance manual specified in Section 01770.
- .7 Templates:
 - .1 Submit templates to *Contractor* for use by installers and fabricators as required for proper location and installation of hardware.

1.4 LEED Requirements

- .1 Comply with the requirements of Sections 01352, 01355, 01359, and 01611, as applicable.
- .2 Waste management and disposal:
 - .1 Comply with the waste management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01355. Comply with the directions of the *Contractor's* LEED coordinator with regard to waste management and disposal activities.
- .3 Construction indoor air quality (IAQ) management:

Washroom Accessories

- .1 Comply with the IAQ management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01359. Comply with the directions of the *Contractor's* LEED coordinator with regard to IAQ management activities.
- .4 Recycled Content and Regional Materials:
 - .1 Wherever possible, materials used in work of this Section are to contain high amounts of recycled content and are to be sourced regionally from within 800 km via truck or 2400 km via rail or ship from jobsite in accordance with Section 01611.

1.5 Delivery, Storage and Handling

- .1 Package or crate, and brace products to prevent distortion in shipment and handling. Label packages and crates, and protect finish surfaces by sturdy wrappings.
- .2 Deliver products to location at the *Place of the Work* designated by *Contractor*.

PART 2 - PRODUCTS

2.1 Products

- .1 Incorporate reinforcing, fastenings and anchorage required for building-in of *Products*.
- .2 Specified manufacturer's catalogue references are the minimum acceptable standards for work of this section. Where two manufacturers or *Products* are specified for a given accessory, select one or the other for installation in the *Work*, but not both.
 - .1 Acceptable product manufacturers:
 - .1 ASI Watrous Inc.
 - .2 Bobrick Washroom Equipment, Inc.
 - .3 Bradley Corporation.
- .3 Lettering: for identification of accessories and operation instructions shall be silk screened using international symbols unless otherwise specified.
- .4 Washroom Accessory Schedule; locations as indicated or scheduled:
 - .1 TPD-1; Roll toilet tissue dispenser:
 - .1 Heavy duty chrome-plated 18 gauge steel, heavy duty brake spring, concealed self locking device/vandal resistant.
 - .1 Double roll: Bobrick 'B-265' or ASI '0715'.
 - .2 Single roll: Bobrick 'B-264' or ASI '0710'.
 - .2 SND-1; Sanitary napkin disposal: Bobrick 'B-270' or ASI '0852'.
 - .1 Surface mounted, satin finish stainless steel, sloping hinged cover.
 - .3 SD-1; Soap dispenser: Bobrick 'B-2111' or ASI '0347'.
 - .1 Delivers measured amount of soap, concealed mounting, stainless steel.
 - .4 WR-1; Waste receptacle: Bobrick 'B-275' or ASI '0825' or Frost '304 NLS'.
 - .1 17-20 gallons, stainless steel, bag holder or liner.
 - .5 MR-1; Tempered mirrored glass: Bobrick 'B-290' or ASI '0600'.

Washroom Accessories

- .1 Polished steel/tempered glass.
- .6 MR-2; Tempered mirror glass with shelf: Bobrick 'B-292' or ASI '0620'.
 - .1 Theft resistant angle frame mirror, 1 piece stainless steel shelf, front return edge hemmed for maximum rigidity and safety, corners Heliarc welded ground and polished smooth.
- .7 MR-3; Tilting barrier-free mirror: Bobrick 'B-294' or ASI '0600T'.
 - .1 410 mm x 610 mm, tilt forward capability to provide full wheelchair visibility, stainless steel frame, glass mirror electrolytically copper plated, top of mirrors tilts 180 mm from wall with self locking mechanisms, bottom of mirror mounts to wall with full length stainless steel hinge.
- .8 NC; Nurse call: call switch with pull cord with connection to P/A rack.
- .9 RH-1; Robe hook: Bobrick 'B-233' or ASI '8425'.
 - .1 Stainless steel, satin finish.
- .10 PTD-1; Paper towel dispenser: Bobrick 'B-233' or Bobrick 'B263 Centerfold' or Bobrick 'B-2860' or ASI 'W-1105-SL'.
 - .1 Stainless steel welded construction Type 304, No. 4 (20 & 22 gauge) brushed finish, front loading, lock, full length piano hinge on door.
- .11 HD-1; Infrared hand dryer, electric:
 - .1 Acceptable products:
 - .1 Bobrick "B-700".
 - .2 ASI '0185'.
 - .2 Surface mounted, vandal resistant cast iron covers, fixed nozzle, auto pilot.
 - .3 Electronic controls: Infrared sensor automatically turns dryer on when hands are held under air outlet. Removal of hands causes dryer to stop within 2 seconds. Electronic sensor shuts off dryer after 35 seconds if hands are not removed or inanimate object is placed across air outlet.
- .12 CHT; Changing table: Totmate '8544A', toddler walk up changing centre.

PART 3- EXECUTION

3.1 Installation

- .1 Submit manufacturer's information and templates required for installation of work of this section, and assist or supervise, or both, the setting of anchorage devices, and construction of other work incorporated with *Products* specified in this section in order that they function as intended.
- .2 Install work to meet manufacturers' recommended specifications, true, tightly fitted, and level or flush to adjacent surfaces, as suitable for installation.
- .3 Include reinforcing, anchorage and mounting devices required for the installation of each *Product*.
- .4 Fit joints and junction between components tightly and in true planes, conceal and weld joints where possible.

Washroom Accessories

- .5 Fabricate *Products* with materials and component sizes, metal gauges, hardware, reinforcing, anchors, and fastenings of adequate strength to ensure that washroom accessories will remain free of warping, buckling, opening of joints and seams, and distortion within limits of intended use.
- .6 Supply handling instructions, anchorage information, roughing-in dimensions, templates and service requirements for installation of the work of this section, and assist or supervise, or both, the setting of anchorage devices and construction of other work incorporated with *Products* specified in this section.

3.2 Barrier Free Installation Heights

- .1 Install accessories to permit operable parts and controls to be accessed at 1100 mm (43") maximum above finished floor, unless otherwise indicated.

3.3 Installation of Washroom Accessories

- .1 Provide manufacturer's handling instructions, anchorage information, roughing-in dimensions, and templates for installation of the work of this section.
- .2 Install and secure fixtures rigidly in place as follows:
 - .1 Use expansion shields in solid masonry or concrete, toggle bolts in hollow masonry or sheet metal screws at metal studs.
- .3 Install grab bars in accordance with manufacturer's recommendations, on built-in plywood backing.
- .4 Install only as specified by manufacturer.
- .5 Verify locations and mounting heights with *Consultant* before roughing-in.
- .6 Install plumb, level, straight, tight and secured, centred between joints on masonry and tile walls.
- .7 Insulate surfaces to prevent electrolytic action due to contact with dissimilar metals, or concrete or masonry if required. Use bituminous paint or other approved means.

3.4 Adjustment and Cleaning

- .1 Verify under work of this section that installed *Products* function properly, and adjust them accordingly to ensure satisfactory operation. Test mechanisms, hinges, locks, and latches and adjust and lubricate to ensure washroom accessories are in perfect working order.
- .2 Do not remove protective coatings until final cleaning, or earlier if directed by *Consultant*.
- .3 Refinish damaged or defective work so that no variation in surface appearance is discernible. Refinish work at *Place of the Work* only if approved.

END OF SECTION

FLAGPOLE

PART 1 – GENERAL

1.2 Scope of Work

- .1 The scope of work includes the supply and installation of a flagpole and footing in the locations indicated on the drawings.
- .2 Confirm utility location prior to excavation for footing.

PART 2 – PRODUCTS

2.1 Flag Pole

- .1 Flagpole supplied by Flag Outlet or approved equal. 457 Commissioners Road East, London ON N6C2T6 (www.flagoutlet.ca)
- .2 30' high Cone Tapered Flagpole:
 - .1 Finish: Clear Anodized
 - .2 Halyard: Internal with locking door
 - .3 Ball: Rotating
 - .4 Mount: Anchor Bolt Assembly with Tilting Base
 - .5 Footing: minimum size – 1.2m deep x 400mm wide
- .3 Flag: Canadian Flag – 910 x 1829 (36" x 72")

2.2 Materials

- .1 Concrete Footing: for concrete requirements refer to Section 02520.

PART 3 – EXECUTION

3.1 Install Mount

- .1 Install mounting assembly with concrete footing to a minimum depth of 1.2m.
- .2 Footing shall slope away from mount and finish 50mm (2") above surface grade.

3.2 Install Pole

- .1 Install and assemble equipment as per manufacturers instructions.

END OF SECTION

Metal Lockers

PART 1 - GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 Section Includes

- .1 Prefinished metal lockers.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 LEED submittals:
 - .1 Submit LEED submittals in accordance with Section 01352, 01359 and 01611.
 - .2 Submit documentation to verify compliance with LEED objectives and requirements.
- .3 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .4 Shop drawings:
 - .1 Indicate thicknesses of metal, fabricating methods, assembled banks of lockers, bases, trim, numbering, filler panels, end panels, and sloped tops.
- .5 Samples:
 - .1 Submit sample of colour and finish on actual base metal.

1.4 LEED Requirements

- .1 Comply with the requirements of Sections 01352, 01355, 01359, and 01611, as applicable.
- .2 Waste management and disposal:
 - .1 Comply with the waste management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01355. Comply with the directions of the *Contractor's* LEED coordinator with regard to waste management and disposal activities.
- .3 Construction indoor air quality (IAQ) management:
 - .1 Comply with the IAQ management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01359. Comply with the directions of the *Contractor's* LEED coordinator with regard to IAQ management activities.
- .4 Recycled Content and Regional Materials:
 - .1 Wherever possible, materials used in work of this Section are to contain high amounts of recycled content and are to be sourced regionally from within 800 km via truck or 2400 km via rail or ship from jobsite in accordance with Section 01611.

Metal Lockers

PART 2 - PRODUCTS

2.1 Materials, Fabrication

- .1 Acceptable manufacturers/*Products*:
 - .1 General Storage Systems (GSS): 'Décor Tri-Lok Titan'.
 - .2 Or approved equal.
- .2 Acceptable alternates:
 - .1 Hadrian 'Emperor'.
 - .2 ASI 'Traditional Collection – Modified'.
- .3 Lockers: to CAN/CGSB-44.40.
 - .1 Type:
 - .1 Single tier full-height locker.
 - .2 2-tier locker.
 - .3 3-tier locker.
 - .2 Size (width x depth x height):
 - .1 305 mm x 380 mm x 1830 mm (12" x 15" x 72").
 - .3 Locking system: prepped for combination padlock locking mechanism.
 - .4 Metal materials: to ASTM A1008/A1008M-07, free of imperfections.
 - .5 Frame: 1.6 mm (0.06") thick (16 gauge).
 - .6 Door:
 - .1 Minimum 1.6 mm thick (16 gauge) outer panel and 0.8 mm thick (22 gauge) liner, hollow core or honeycomb.
 - .2 Hinge: continuous piano hinge.
 - .7 Shelves: minimum 0.6 mm (0.02") thick (24 gauge)
 - .8 Hooks: three single prong coat hooks.
 - .9 Body: minimum 0.6 mm (0.02") thick (24 gauge).
 - .10 Sloped top: minimum 20 gauge, mitred at corners.
 - .11 Filler and end panels: minimum 20 gauge.
 - .12 Base:
 - .1 Locker manufacturer's standard minimum 16 gauge metal base, 100 mm (4") high.
 - .13 Number plates numbered as directed by the *Consultant*.
 - .14 Locker finish; exposed and semi-exposed surfaces: baked on polymer powder or alkyd enamel, custom colour to later selection by the *Consultant*. Frame colour shall match door colour unless otherwise indicated.

Metal Lockers

PART 3- EXECUTION

3.1 Installation

- .1 Assemble and install lockers complete with metal base in accordance with manufacturer's printed installation instructions.
- .2 Securely fasten at least every third locker through to wall studs, masonry or concrete substrate.
- .3 Install trim and filler panels where required for continuous appearance and where obstructions occur. Specific conditions as indicated.
- .4 Install finished end panels to exposed ends of locker banks.

END OF SECTION

Retractable Awnings

PART 1 - GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 Quality Assurance

- .1 Qualifications of Manufacturer: Manufacturer of canopy shall be specialist in this field having minimum of 5 years continuous experience in manufacturing and installing canopies.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 LEED submittals:
 - .1 Submit LEED submittals in accordance with Section 01352, 01359 and 01611.
 - .2 Submit documentation to verify compliance with LEED objectives and requirements.
- .3 Shop drawings:
 - .1 Indicate on shop drawings the framing members, method of installation, dimensions, connection details, and other information to describe construction, finishing details, and installation instructions of canopy.
 - .2 Submit engineering data relating to framing components.
 - .3 Design of framing members to be by a professional engineer registered in the *Place of the Work*. Professional engineer to be experienced in this type of engineering and in accordance with Section 01330.
- .4 Samples:
 - .1 Submit samples of each component of framing system and canopy fabric for review. Do not order materials until samples are reviewed. Samples shall fully represent materials to be supplied in colour, sheen, finish and construction.
 - .2 Submit 300 mm (12") square samples of canopy fabrics of specified weight from which *Consultant* selects final colour. Submit samples of typical seaming method, hems and attachment to metalwork details for general workmanship and methods.
- .5 Data manual:
 - .1 Submit copies of maintenance and cleaning instruction manuals for canopy in accordance with Section 01770.
 - .2 Instructions shall include specific warning of maintenance and cleaning operations, practices or materials which may damage or disfigure the canopy components.

1.4 LEED Requirements

- .1 Comply with the requirements of Sections 01352, 01355, 01359, and 01611, as applicable.

Retractable Awnings

.2 Waste management and disposal:

- .1 Comply with the waste management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01355. Comply with the directions of the *Contractor's* LEED coordinator with regard to waste management and disposal activities.

.3 Construction indoor air quality (IAQ) management:

- .1 Comply with the IAQ management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01359. Comply with the directions of the *Contractor's* LEED coordinator with regard to IAQ management activities.

.4 Recycled Content and Regional Materials:

- .1 Wherever possible, materials used in work of this Section are to contain high amounts of recycled content and are to be sourced regionally from within 800 km via truck or 2400 km via rail or ship from jobsite in accordance with Section 01611.

1.5 Design Requirements

- .1 Design support system and canopy to withstand safely and without distortion, the superimposed live and dead loads including wind and snow in accordance with the building code.

1.6 Product Handling

- .1 Ship exposed members with protective coverings. Bent or deformed material shall be rejected. Canopy members shall be suitably wrapped and protected against damage.

1.7 Warranty

- .1 Warrant work of this section for a period of 2 years, in accordance with Section 01780.

PART 2 - PRODUCTS

2.1 Materials

.1 Acceptable *Product*:

- .1 'Adalia Extreme (X3M)' by Rolltec Rolling Systems Ltd., power coated aluminum fittings and framing.
- .2 Motorized operation: '53582 CMO' by Somfy Systems.
- .3 Fabric: Sunbrella fabric, custom colour to later selection by *Consultant*.

- .2 Fastening Accessories: as recommended by manufacturer.

2.2 Fabrication

- .1 Fabricate retractable system, to the design and dimensions indicated. Take field measurements where co-ordination with adjoining work is necessary.
- .2 Fabricate metal framework of knockdown components having screwed fittings and sufficient strength to adequately sustain all forces.

Retractable Awnings

- .3 Lay out panels of covering to dimensions shown on reviewed shop drawings. Double stitch seams and reinforce corners.
- .4 Provide laced tuck bands and method of adjusting tautness for attachment of covering to pipe supports. Include end panels for each exposed canopy section.
- .5 Neatly arrange grommets in straight lines equidistant from canopy edges.
- .6 Perform cutting and fitting of canopy framing system in factory.
- .7 Electrical connection by division 16.
- .8 Controls and sensors by division 15.

PART 3 - EXECUTION

3.1 Installation

- .1 Install retractable awning framing system and covering in strict accordance with manufacturer's printed instructions.
- .2 Do not start *Work* of this section until *Work* of other trades has been completed, inspected and accepted.
- .3 Erect framework level and rigidly supported from framing members. Ensure positive contact with reinforcement, and use anchors designed to allow safety factor of 5.
- .4 Execute *Work* as shown and conform to profiles, details and other conditions as indicated on drawings and required by *Place of the Work* conditions.
- .5 Erect finished *Work* rigid, secure, square, level, plumb and frame to maintain dimensions and contours indicated. Make allowances for thermal and structural movement. Maximum acceptable sag in leading edge of canopy (under no snow load); 1:250(1/2" in 10'-0") after installation of covering.

3.2 Cleaning and Completion

- .1 Protect *Work* of this section. Carefully examine *Work* on completion and replace uneven or defective *Work*, remedy damaged exposed finished surfaces, including inserts and to the complete satisfaction of *Consultant*.
- .2 Clean dirty and discoloured surfaces according to manufacturer's recommendations.

END OF SECTION

Fall Arrest Anchors and Building Maintenance Equipment

PART 1 - GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 Section Includes

- .1 Fall arrest lifeline anchors, building maintenance, and window cleaning systems; system design and layout:
 - .1 Locations and quantities indicated in the *Contract Documents* are schematic only and do not purport to identify or solve the specified performance criteria that the work of this section is required to meet or surpass.
 - .2 Final design, including locations and quantities are part of the work and responsibility of this section.
 - .3 Careful coordination is required with the work of related sections to ensure that allowances are made therein for the final design of the work of this section.
- .2 *Provide* the following systems:
 - .1 Fall arrest lifeline anchors.
 - .2 Horizontal lifelines.

1.3 Reference Standards

- .1 The standards referenced in this section are to the following editions:
 - .1 CAN/CSA G164-M92 – Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .2 CSA W47.1-03 (R2008) – Certification of Companies for Fusion Welding of Steel.
 - .3 CSA W55.3-08 – Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
 - .4 CSA W59-03(R2008) – Welded Steel Construction (Metal Arc Welding).
 - .5 CAN/CSA Z91-M90 – Health and Safety Code for Suspended Equipment Operations.
 - .6 CAN/CSA-Z271-98 (R2004) – Safety Code for Suspended Elevating Platforms.

1.4 System Description

- .1 Safety anchor system engineered and designed to allow for the safe execution of window washing and building maintenance. Work to be interfaced with roofing systems to maintain continuous water protection of the roofing system.
- .2 Design system to achieve adequate attachment compatible with current window washing and maintenance practices and equipment.
- .3 Systems shall be watertight to a line 50 mm (2") above highest point of water scuppers or to heights of other drainage measures, whichever is greater, to prevent water intrusion into anchor systems and building. Alternatively, design anchors to be water-tight in fully immersed state, without requirements for periodic water-tightness inspections by *Owner* during the life of roofing system.

Fall Arrest Anchors and Building Maintenance Equipment

- .4 System shall be tested by accredited laboratory to confirm conformance to regulatory and design requirements.
- .5 Structural eyes to be minimum 203 mm (8") above the finished roof membranes, where feasible.
- .6 Coordinate anchorage requirements with manufacturer of precast concrete deck. Refer to Section 03410.
- .7 Guidelines: Regulation for Window Cleaning Roof Anchorage for Fall Arrest Systems and Tiebacks for Suspended Equipment Primary Support issued by the Ontario Ministry of Labour.

1.5 Quality Assurance

- .1 Retain a Professional Engineer registered in the *Place of the Work* to design the work of this section; to prepare, seal and sign shop drawings; and to perform field review. Shop drawings shall show both design and installation requirements.
- .2 Manufacturer/designer qualifications: Must specialize in designing and manufacturing *Products* specified in this section. Required 5 years documented experience and minimum \$2,000,000 legal liability insurance for anchor design, installation and failure.
- .3 Fabricator qualifications: Must specialize in fabricating *Products* specified in this Section with 5 years documented experience and minimum \$2,000,000 legal liability insurance for anchor fabrication.
- .4 Installer qualifications: Must be acceptable to the manufacturer with 5 years documented experience and minimum \$2,000,000 legal liability insurance for anchor installation and failure.
- .5 Testing agency qualifications: Must have a proven record of 5 years of testing fall arrest and safety anchors and a professional engineer meeting qualifications required for professional engineers preparing shop drawings in accordance with Section 01330.
- .6 Conduct a pre-installation meeting in accordance with Section 01312.
- .7 Conduct quality control in accordance with Section 01450.
- .8 *Products* shall be sourced from one manufacturer unless otherwise specified.

1.6 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 LEED submittals:
 - .1 Submit LEED submittals in accordance with Section 01352, 01359 and 01611.
 - .2 Submit documentation to verify compliance with LEED objectives and requirements.
- .3 *Product* data sheets:
 - .1 Submit test data from qualified testing agency for structural compliance with standards.
- .4 Log book:
 - .1 Submit to the building *Owner* a maintenance log to be used for annual inspections.

Fall Arrest Anchors and Building Maintenance Equipment

.5 As-builts:

- .1 Submit 5 copies of as-built drawings upon completion of work to serve as roof sketch. Encase each drawing for each location in clear hard plastic. Mount to wall at required locations.
 - .1 Provide wall-mounted encased drawings at the following locations:

.6 Shop drawings:

- .1 Submit engineered shop drawings.
- .2 Submit shop drawings, showing complete layout and configuration of system, locations, spacing, anchor heights, anchor waterproofing measures, and other components and accessories.
- .3 Clearly indicate design, fabrication details, plans, design, elevations, hardware details, installation details and loads transmitted to structure.
- .4 Submit detail drawings for anchor securement to structure, design details, plans, elevations and all accessories necessary for a complete and functional system.
- .5 Shop drawings shall include design to meet the requirements of authorities having jurisdiction. This section shall be responsible for locations, quantity and type of anchors required to suit requirements. Drawings indicate diagrammatic and general information only.

.7 Certifications and evidence:

- .1 Submit proof of manufacturer/fabricators/installer's specific liability insurance (*Products* and completed operations) for all aspects of the engineering, design, and installation of components and against failure.
- .2 Submit letter of compliance from the structural engineer by whom the engineer certifies that anchors meet design and regulatory requirements.

1.7 LEED Requirements

- .1 Comply with the requirements of Sections 01352, 01355, 01359, and 01611, as applicable.
- .2 Waste management and disposal:
 - .1 Comply with the waste management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01355. Comply with the directions of the *Contractor's* LEED coordinator with regard to waste management and disposal activities.
- .3 Construction indoor air quality (IAQ) management:
 - .1 Comply with the IAQ management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01359. Comply with the directions of the *Contractor's* LEED coordinator with regard to IAQ management activities.
- .4 Recycled Content and Regional Materials:
 - .1 Wherever possible, materials used in work of this Section are to contain high amounts of recycled content and are to be sourced regionally from within 800 km via truck or 2400 km via rail or ship from jobsite in accordance with Section 01611.

Fall Arrest Anchors and Building Maintenance Equipment

1.8 Fall Arrest Lifeline Anchor Systems Certification

- .1 Submit to *Consultant* sealed letter of acceptance for installed fall arrest lifeline anchor systems, prepared by qualified professional engineer licensed to practice in *Place of the Work*.

1.9 Delivery, Storage and Handling

- .1 Comply with requirements of Section 01600.
- .2 Deliver anchor system and accessories to the *Place of the Work* in original undamaged condition. Store to ensure no damage occurs to the components by either physical or moisture damage prior to or during installation.

1.10 Warranty

- .1 Warrant work of this section for a period of 2 years, in accordance with Section 01780.

PART 2 - PRODUCTS

2.1 Acceptable System Manufacturers

- .1 Acceptable Manufacturers:
 - .1 Ankor Engineering Systems Inc.
 - .2 Atlas Anchors (BC) Ltd.
 - .3 Pro-Bel Enterprises Limited.
 - .4 Thaler Roofing Specialties Inc.

2.2 Fall Arrest Lifeline Anchor System

- .1 Roof anchor materials; wall and roof mounted:
 - .1 Eye ring: Forged from Type 304 stainless steel.
 - .2 Bolts/washers/nuts: Type 304 stainless steel.
 - .3 Upright/baseplate: HSS welded to base plate and hot dip galvanized.
- .2 Anchors shall be designed and engineered to support 360° maximum working load.
- .3 When steel piers are used instead of concrete piers, steel for pier to be hot dipped galvanized and pier to be filled with urethane foam insulation.

2.3 Horizontal Lifeline System

- .1 Cable: 8 mm (5/16") diameter, Type 316 stainless steel with minimum breaking strength of 85 kN (19,125 lbs), complete with permanently swaged cable ends.
- .2 Data plate: cable system entry points to be equipped with prominently displayed, non-corrosive data plate clearly stating maximum service capacity and number of users.
- .3 Standard intermediate support brackets: multi-position, Type 316 stainless steel with reinforcing end caps and suitable for installation at height to suit required position. Secured using 13 mm (1/2") diameter fasteners.
- .4 Mobile intermediate support brackets: multi-position, Type 316 stainless steel for working both sides of sloped roof at ridge point.

Fall Arrest Anchors and Building Maintenance Equipment

- .5 Corner units: manufacturer's standard flexible corner units, as required.
- .6 End terminal hardware: stainless steel swedged termination at one end, and stainless steel tensioner with shock absorber at other end.
- .7 Lanyard cable runner: Type 316 stainless steel with automatic runner bypass for continuous hands-free operation that can be inserted or removed anywhere on the cable
- .8 Harness: manufacturer's standard hands-free full body harness and lanyard complete with shock absorber.

PART 3- EXECUTION

3.1 Examination

- .1 Examine structural, deck and roofing conditions and proceed with work in accordance with Section 01450.
- .2 Examine structure, decking and roofing in the area of the installation and notify the *Consultant* of any adverse conditions which could jeopardize the systems installation or the future performance of the roofing assembly. Do not proceed until such conditions have been documented, assessed, rectified and approved for the anchor installation. Starting work indicates acceptance of conditions unless *Consultant* is notified otherwise in writing.

3.2 Installation

- .1 Install a roof anchor systems on the building under the supervision of a qualified professional engineer registered in *Place of the Work*.
- .2 Fabricate and erect work true to dimensions, square, plumb, level and free from distortion or defects detrimental to appearance and performance.
- .3 Include anchorage and mounting devices required for the installation.
- .4 Surplus welding material shall be ground off and exposed internal and external corners shall have sharp lines. Remove grind marks on exposed surfaces.
- .5 Where fastenings or anchors have to be built in by other trades, supply them with necessary templates, instructions and supervision to ensure satisfactory installation. Supply metal anchoring devices.
- .6 Back paint components where contact is made between dissimilar metals.
- .7 Install anchor system in accordance with manufacturers printed instructions, reviewed shop drawings and as specified herein.
- .8 Following acceptance of the anchor installation and roof flashings by the *Consultant*, deform the thread ends of anchor studs where threaded studs have been used.
- .9 Seal between assemblies and adjacent materials to ensure watertight installations in accordance with Division 7.
- .10 Clean and touch-up steel surfaces with zinc rich primer where burned by field welding or where damaged.

3.3 Demonstration

- .1 Demonstrate in the presence of the *Consultant*, *Contractor*, and *Owner* the operation of equipment following installation.

END OF SECTION

Audio-Visual Equipment

PART 1 - GENERAL

1.1 Summary

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 Section Includes

- .1 Audio visual equipment.

1.3 Quality Assurance

- .1 Qualifications: Provide work of this section, executed by an audio-visual company with minimum 5 years experience in application of Products, systems and assemblies specified and with approval and training of Product manufacturers.
- .2 Conduct a pre-installation meeting in accordance with Section 01312.

1.4 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 LEED submittals:
 - .1 Submit LEED submittals in accordance with Section 01352, 01359 and 01611.
 - .2 Submit documentation to verify compliance with LEED objectives and requirements.
- .3 Product data: Submit manufacturer's Product data sheets for Products proposed for use in the work of this section.
- .4 Shop drawings:
 - .1 Submit shop drawings in accordance with Section 01330.
- .5 Samples: Submit following samples in sizes indicated:
 - .1 Submit samples in accordance with Section 01330.
- .6 Closeout submittals:
 - .1 Operation and maintenance data: On completion of installation, submit operation and maintenance data in accordance with Section 01770.
 - .2 Warranty: Submit manufacturer's standard warranties.

1.5 Operation and Maintenance Training and Related Documentation

- .1 Demonstrate, and provide instruction in, the proper operation and maintenance of the *Products Provided* as part of the work of this section to the *Owner* in accordance with Section 01770.
- .2 Provide:
 - .1 Wiring diagrams and termination schedules.
 - .2 Safety and operational instructions.
 - .3 Contact information for the Contractor and pertinent manufacturers.
 - .4 Complete parts and subassembly list.

Audio-Visual Equipment

- .5 Equipment design parameters.
- .6 Periodic Maintenance Schedule.
- .7 Maintenance procedures for finishes.
- .8 Records of final testing and log.
- .9 Spare parts list and source information.
- .10 Include a master functional schematic drawing, suitable for wall mounting. This drawing demonstrates the functionality and signal flow of the systems and is for reference by operators. This drawing shall be sized so that all text is legible. Systems to be separated graphically or by colour for clarity. The drawing shall be laminated with a rigid backing and a copy mounted where directed by *Consultant*.

1.6 Maintenance Service

- .1 Provide maintenance service for a period of 1 year after final acceptance of the installation. This service consists of at least 2 half-yearly visits to the site for checking and adjusting of equipment.
- .2 Perform the first visit 6 months after the system has been accepted. Arrange visit to be at a time mutually agreeable to the *Owner*.

1.7 Warranty

- .1 Warrant work of this section for a period of 2 years, in accordance with Section 01780.

PART 2- PRODUCTS

2.1 Audi-Visual Equipment

- .1 Acceptable *Product*:
 - .1 Lighspeed 'Redcat'.
 - .2 Substitutions: Refer to Section 01250.
- .2 Provide alternate price:
 - .1 Acceptable *Product*:
 - .1 Lighspeed All-in-one Classroom Audio 'REDCAT' and 'REDMIKE'.
 - .2 Substitutions: Refer to Section 01250.

2.2 Materials

- .1 Text as required.

2.3 Marking

- .1 Label equipment as indicated, so that every patch point can be immediately associated with a specific piece of equipment. That is to say the connector shall be identified with the device it is normally connected with.
- .2 All operating controls, switches, jacks, plugs shall be permanently marked in a clear logical manner utilizing engraved or screened letters, Brother P-Touch strips, or lamacoid label strips. Dymo or similar label strips or hand printed labels are not acceptable.

Audio-Visual Equipment

.3 Wire:

- .1 Without exception, all audio, video, data and control system cables to be individually, uniquely, logically and permanently marked.
- .2 Wires shall be marked as documented on cable risers and system drawings.
- .3 Spare wires shall be marked "spare" at both ends and numbered consecutively.
- .4 A "spare schedule" shall be provided on the risers indicating spare wire numbers, locations and types.
- .5 Wires shall be marked with slip-on or other permanent type sleeves. Cloth or vinyl tape type markers are not adequate and should be replaced by a more permanent type such as Brady DATAB labels.
- .6 Wiring shall be identified in junction boxes and at terminal blocks and wherever accessible.

2.4 Equipment Packaging

- .1 Equipment shall be securely mounted and fastened into racks using either the original manufacturer's rack mounting kits or custom fitted mounting kits.
- .2 Unless otherwise indicated, it shall be unacceptable to put equipment loosely on shelves or stacked on top of other rack-mounted equipment.

2.5 Fasteners

- .1 Exposed screws, such as rack and panel mounting hardware, shall be of quality finish, such as stainless steel or nickel plate. Standard Zinc plating is unacceptable. The fasteners shall be of premium grade Philips, Robertson, hex (Allen), Torx head fasteners only. Black oxide finish is preferred. Nylon washers of equivalent color shall be used to protect the front face of rack-mounted equipment.

PART 3 - EXECUTION

3.1 Preparation

- .1 Take field dimensions and examine conditions of substrates, supports, and other conditions under which this work is to be performed. Do not proceed with work until unsatisfactory conditions are corrected.

3.2 Arrangement of Equipment

- .1 Arrange equipment so that equipment can be removed for repairs or replacement without dismantling or removing other equipment components.
- .2 Accommodate equipment in space indicated.

3.3 Protection

- .1 Provide protective coverings for finished surfaces.

3.4 Installation

- .1 Equipment shall be installed so as to present no safety hazards to the public, to operating personnel, to equipment.

Audio-Visual Equipment

- .2 Equipment must be adequately ventilated when operating under worst-case power dissipation.
- .3 Materials and equipment required for a complete system but not specified herein as to manufacturer or quality shall be of high commercial standard and quality.
- .4 Fabricate and install all items in accordance with manufacturers' recommendations and as indicated.
- .5 Confirm dimensions, distances, and placement prior to the installation of equipment. Report discrepancies to the *Consultant* prior to installation.
- .6 Coordinate with the electrical Subcontractor regarding the installation of the conduit, raceway and back boxes to ensure it meets the needs of the systems specified herein.
- .7 Exposed work shall be fabricated in true planes, flat and straight, free of buckles, waves and other visible imperfections such as "oil canning". Joints shall be accurately fitted and properly aligned. Conceal fasteners. Welds shall be undetectable in finished work.
- .8 Test work of this section and provide necessary documentation proving this work has been completed.

3.5 Touch Up

- .1 Upon completion, touch-up and restore to new condition any damaged or defaced factory finished surfaces.
- .2 Remove protective covering and clean exposed surfaces after completion and leave in first class condition.

3.6 Quality Control

- .1 Perform and meet tests required by building code.
- .2 Supply instruments and carry out performance checks of equipment, including control and operation system. Performance check shall be done in presence of *Consultant* and *Owner*. Notify *Consultant* and *Owner* in writing, at least 1 week prior to date of performance and operational inspection. This section shall be responsible for additional tests required because of outstanding deficiencies.
- .3 Notify *Consultant* and *Owner* in writing, 1 week prior to performance tests.

3.7 Demonstration

- .1 Instruct *Owner's* personnel in proper use, operations, and daily maintenance of equipment. Train *Owner's* personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.
- .2 Make a final check of each equipment operation, with *Owner's* personnel present, immediately before date of *Substantial Performance of the Work*. Determine that control systems and operating devices are functioning properly.

END OF SECTION

Roller Window Shades

PART 1 - GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 Section Includes

- .1 Roller window shades at interior locations.
- .2 Roller window room darkening (black-out) shades at interior locations.

1.3 Quality Assurance

- .1 Manufacturer: Company specializing in manufacturing the *Products* specified in this section, with minimum 10 years experience.
- .2 Installer qualifications: Roller window shade fabricator.

1.4 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 LEED submittals:
 - .1 Submit LEED submittals in accordance with Section 01352, 01359 and 01611.
 - .2 Submit documentation to verify compliance with LEED objectives and requirements.
- .3 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
 - .2 Submit manufacturers' installation instructions.
- .4 Shop drawings:
 - .1 Submit shop drawings or fully dimensioned catalogue cuts.
 - .2 Window treatment schedule: Use same designations indicated on *Contract Documents*.
 - .3 Clearly indicate general construction, configurations, jointing methods and locations, fastening methods, handing of controls, required blocking locations, banding (tandem shades), and installation details.
- .5 Samples:
 - .1 Submit samples of each material and finish colour selected and each accessory.
- .6 Mock-ups:
 - .1 Erect 1 full size mock-up each roller shade type at the *Place of the Work* for review. Completed and accepted mock-up shall act as the standard to which balance of the work of this section will be judged.
- .7 Closeout submittals:
 - .1 Submit closeout submittals in accordance with Section 01770.
 - .2 Operation and maintenance instructions:

Roller Window Shades

- .1 Submit operation and maintenance instructions for incorporation into operation and maintenance manuals.

1.5 LEED Requirements

- .1 Comply with the requirements of Sections 01352, 01355, 01359, and 01611, as applicable.
- .2 Waste management and disposal:
 - .1 Comply with the waste management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01355. Comply with the directions of the *Contractor's* LEED coordinator with regard to waste management and disposal activities.
- .3 Construction indoor air quality (IAQ) management:
 - .1 Comply with the IAQ management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01359. Comply with the directions of the *Contractor's* LEED coordinator with regard to IAQ management activities.
- .4 Recycled Content and Regional Materials:
 - .1 Wherever possible, materials used in work of this Section are to contain high amounts of recycled content and are to be sourced regionally from within 800 km via truck or 2400 km via rail or ship from jobsite in accordance with Section 01611.

1.6 Protection

- .1 Before delivery to the *Place of the Work*, check each shade for operation; remove finger marks and smudges.
- .2 Tightly wrap *Products* in polyethylene or other protective covering and leave in open position until directed.

1.7 Delivery, Storage and Handling

- .1 Package *Products* to prevent distortion in shipment and handling. Label packages and crates, and protect finish surfaces by sturdy wrappings.

1.8 Warranty

- .1 Provide *Product* warranty for work of this section for a period of 2 years against defects in labour, materials, and workmanship in accordance with Section 01780.

PART 2 - PRODUCTS

2.1 Acceptable Manufacturers

- .1 Roller window shades shall be fabricated by one of the following:
 - .1 MechoShade Systems, Inc.
 - .2 Nysan Solar Control, A Hunter Douglas Contract Company.
 - .3 Solarfective Products Ltd.
 - .4 SunProject Toro Inc.
- .2 Substitutions: in accordance with Section 01250.

Roller Window Shades

2.2 Hardware

- .1 Manual: Chain operated, with infinite positioning. Left or right hand operation and banding as applicable to suit *Place of the Work* condition.
 - .1 Drive assembly:
 - .1 Must allow finger tip control and include a built in shock absorber system to prevent chain breakage under normal operating conditions;
 - .2 Factory set for the size and travel of the shades;
 - .3 Capable of being field adjusted from the exterior of the shade unit without having to disassemble the hardware.
 - .4 Drive Chain: No. 10 stainless steel bead chain formed in a continuous loop. The chain shall have passed a 40 kg (90 lb) load test. Chain may be positioned at either, or both, ends of the shade without disassembly of the shade unit.
 - .5 Provide counter balancing mechanism designed to offset the weight of the shade and give fingertip control.
 - .2 Control shades and room darkening shades independently.

2.3 Assembly

- .1 Provide fully factory assembled shade unit consisting of 2 end shade brackets, shade tube, extruded aluminum fascia, hembar and fabric as specified.
- .2 Factory modify housings where necessary to bypass columns.
- .3 End brackets: a two piece moulded ABS construction with a 6.35 mm (1/4") diameter nylon drive sprocket. Bracket colour shall coordinate with the fascia colour.
- .4 Shade tube: Minimum 1.52 mm (0.060") thick extruded aluminum with three equally spaced continuous stiffening fins, non-sag design, maximum deflection under full load of fabric L/700.
- .5 Fascia: 1.7 mm (0.067") thick extruded aluminum.
- .6 Hembar: Extruded aluminum with matching plastic end finials.
- .7 Mounting: Removal of shade system shall not require the disassembly of the shade unit.
- .8 Room darkening shade features: 13 mm (1/2") pile mounted in prefinished 38 mm x 28 mm (1-1/2" x 1-1/8") extruded aluminum side and bottom channels finished to match mullions. Include Dynamic hembar to allow for variance in window sill level.

2.4 Shade Mounting System

- .1 Extruded aluminum bracket designed to accept preassembled shade system.
 - .1 Brackets to be used to facilitate the alignment with shade opening.
- .2 Modular construction: Shades must be removable as a complete modular unit without any component disassembly required.

2.5 Aluminum Finish

- .1 Exposed aluminum: Baked enamel, colour to match window mullion finish.

Roller Window Shades

- .2 Unexposed aluminum: mill finish.

2.6 Shade Fabric Types

- .1 Sun control fabric:
 - .1 Acceptable *Products*; 5% open area:
 - .1 MechoShade 'EuroVeil 5300 Series'.
 - .2 MechoShade 'ThermoVeil Series 1300'.
 - .3 Solarfective 'Solarshield 500 Series'.
 - .4 SunProject Toro'RT300'.
 - .2 Colour: as selected by *Consultant* from manufacturer's full range.
- .2 Room darkening (blackout) fabric:
 - .1 406 gm/m² (12 oz/yd²), 4 ply (1 ply woven fibreglass, 3 ply PVC film), dimensionally stable, opaque blackout fabric.
 - .1 Acceptable *Products*:
 - .1 MechoShade 'Equinox 0100 Series'.
 - .2 MechoShade 'ThermoVeil 0600 Series'.
 - .3 Nysan 'X-Lite' Black out fabric.
 - .4 Solarfective Products Limited 'SolarStop Blackout Fabric'.
 - .5 SunProject 'BO500'.
 - .2 PVC-free, 0 VOC, 400 microns (16 mils) thick, PVC-free polyurethane and prestretched polyester core, dimensionally stable, opaque blackout fabric.
 - .1 Acceptable *Products*:
 - .1 Nysan 'SuperSol Blackout'.
 - .3 Colour: as selected by *Consultant* from manufacturer's full range.
 - .3 Performance: Fabric shall hang flat, without buckling or distortion. Edge, where trimmed, shall hang true and straight, without shifting sideways more than 3 mm (1/8") in either direction due to warp distortion or weave design.
 - .4 Flammability:
 - .1 Certified by an independent Laboratory to pass CAN/ULC S109-03 Large Flame Test.

2.7 Fabrication

- .1 Finished assemblies shall be, square, true to size and free from distortion, twist, or other defects that could affect their strength, operation or appearance. Factory applied finish shall be uniform, smooth and without blemishes.
- .2 The fabric shall be colour fast, retain its shape, not be affected by moisture or heat, and shall be non-flammable. Cut fabric to eliminate glare and reflection from shining surfaces while maintaining exterior view. The top of the fabric is retained in recessed spline of the shade roller and the bottom of the fabric is retained by the hem bar.

Roller Window Shades

PART 3 - EXECUTION

3.1 Installation

- .1 Install work by manufacturer's skilled tradesmen and installed in strict accordance with manufacturers recommendations.
- .2 Install shade systems in a plumb, squared, rigidly coupled and adequately anchored, maintaining uniformed clearances, accurate alignment levels, and parallel with the window plane. Fabric shall not travel more than 3 mm (1/8") in either direction within channels after installation.
- .3 Fabric shall be pre-measured and manufactured off-site.
- .4 Shades shall be snapped into place without screws or visible fasteners.
- .5 Incorporate reinforcing, fastening and anchorage required for installation of shades.
- .6 Securely attach installation fittings to their mounting surfaces with stainless steel or hardened aluminum screws of proper length and type, and durable anchors.
- .7 Install shade roller true and level, and with cloth to hang flat without buckling or distortion.
- .8 Room darkening shades to be installed to eliminate passage of light from exterior.

3.2 Adjustment and Cleaning

- .1 Verify that installed shade system functions properly, and adjust it accordingly to ensure satisfactory operation.
- .2 Refinish damaged or defective work so that no variation in surface appearance is discernible.

END OF SECTION

MRL Gearless Traction Elevators

PART 1 - GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 Quality Assurance

- .1 Manufacturer: Elevators shall be manufactured by a firm with a minimum of 10 years of experience in fabrication of elevators equivalent to those specified.
- .2 Installation: Elevators shall be installed by the manufacturer.
- .3 Inspection and testing: In accordance with requirements of local jurisdiction, obtain required permits, inspections and tests.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 LEED submittals:
 - .1 Submit LEED submittals in accordance with Section 01352, 01359 and 01611.
 - .2 Submit documentation to verify compliance with LEED objectives and requirements.
- .3 Submit information regarding power requirements, ventilation, requirements, cut-outs, access requirements and lighting and outlet locations, within 2 weeks subsequent to *Contract* award.
- .4 Submit a completion schedule showing equipment delivery dates, and anticipated completion date for each elevator.
- .5 Shop drawings:
 - .1 Submit shop drawings showing the complete layout of the elevator equipment, location of machinery and apparatus, loads to be carried on building structure and design of elevator cab, hoistway entrances and signals. Submit layout to elevator authorities having jurisdiction before work proceeds. At the review of shop drawings, hoistway sizes and electrical current characteristics will be confirmed.
 - .2 Include on shop drawings:
 - .1 Size and location of machine, controller and piping.
 - .2 Size and location of car, hoisting beam, guide rails, buffers and other components in hoistway.
 - .3 Rail bracket spacing and maximum loads on guide rails.
 - .4 Reactions at points of support.
 - .5 Weights of principal components.
 - .6 Top and bottom clearance and over travel of car.
 - .7 Location of circuit breaker, switchboard panel or disconnect switch, light switch and feeder extension points in machine room.
 - .8 Location for connection of travelling cables.

MRL Gearless Traction Elevators

- .9 Location and size of access doors.
- .10 Loads on hoisting beams.
- .11 Expected heat generation of equipment in machine room.
- .12 Seismic design data.
- .13 Car and counterweight safeties.
- .3 Include on general arrangement drawings:
 - .1 Type, size, location of hoistway entrances showing details of fastening to hoistway structure.
 - .2 Provide detailed calculations for seismic design.
- .4 Submit shop drawings showing the complete elevations, ceiling plan, overall layout and details of the elevator car.
- .6 Submit shop drawings showing the complete layout of the elevator equipment, location of all machinery and apparatus, loads to be carried on building structure and design of elevator cab, hoistway entrances and signals in accordance with Section 01330. Submit layout to authorities having jurisdiction before work proceeds. At the review of shop drawings, hoistway sizes and electrical current characteristics will be confirmed.
- .7 Submit shop drawings showing the complete elevations, ceiling plan, overall layout and details of the elevator car.
- .8 Submit samples of materials which will be visible in the finish before fabrication in accordance with Section 01330. Samples shall fully represent the physical and chemical properties of the materials to be supplied.
- .9 Closeout submittals:
 - .1 As-Built Records
 - .1 Submit as-built records in accordance with Section 01770.
 - .2 Record actual locations of equipment, names or equipment manufacturers and suppliers, concealed conduit and boxes, concealed devices, disconnects.
 - .3 Supply the *Owner* with as-builts drawings (elevator & mechanical) complete with maintenance and operating manuals, and tools, or devices (proprietary or otherwise) as required to maintain, service, and operate the elevators.
 - .2 Operation and Maintenance Data
 - .1 Provide operation and maintenance data for incorporation into manual specified in Section 01770.
 - .2 Include description of elevator system's method of operation and control including motor, door operation, signals, and special or non-standard features provided.
 - .3 Provide parts catalogues with complete list of equipment replacement parts with equipment description and identifying numbers.
 - .4 Legible schematic of wiring diagrams covering electrical equipment installed, including changes made in final work, with symbols listed corresponding to identity or markings on both machine room and hoistway apparatus.
 - .5 Lubrication chart.

MRL Gearless Traction Elevators

- .6 Planned maintenance tasks and their frequencies.
- .7 Maintenance of special finishes.
- .8 Submit to the *Owner* any tools or devices that are required not only for basic operation and maintenance of the elevator, but also for troubleshooting or reprogramming. Include a user's guide/reference manual that effectively communicates to a qualified mechanic how to use the controller and/or tool, and that also defines and explains all respective error codes, including required fixes. The devices, tools, and user's manual so submitted shall be such as to allow any qualified maintenance service company to be able to provide proper maintenance services.
- .3 Log Book: Provide maintenance log book for recording maintenance activities.
- .4 Storage cabinet: Provide suitable prefinished metal storage cabinet mounted in machine room for proper protection and storage of as-built records, log book, spare parts, and operation and maintenance data.
- .5 Maintenance/Warranty
 - .1 Provide maintenance services and warranty materials and installation for a period of 1 year from date indicated in Section 01780.
 - .2 Maintenance service shall include call-back service between regular inspections and shall be available during the regular working hours and days without additional cost to the Owner including emergency service, which shall be provided on a 24-hour per day, 7 days a week basis, during the maintenance period. Include for release of trapped passengers or carrying out necessary repairs at no additional service charge.
 - .1 Response Time: One hour or less.
 - .3 Maintenance service shall include equipment servicing frequency of 1 service visit per month.
 - .4 Maintenance shall include the systematic examination, adjustment and lubrication of elevator equipment and apparatus and repair or replacement of the electrical and mechanical parts of the elevator equipment and apparatus. Repair equipment whenever this is required and use only genuine standard parts produced and manufactured for the equipment concerned.
 - .5 Replace wire ropes as often as necessary to maintain an adequate factor of safety.
 - .6 *Owner* reserves the right to reassign full service maintenance work to another qualified elevator maintenance company in the event a professionally qualified unbiased third party deems this Section to be deficient in the performance of its maintenance duties and has found this Section negligent in completing noted deficiency items within 30 days of receiving written notification of such deficiencies. Resulting and additional costs, as incurred by the *Owner* when maintenance services are re-assigned, shall be the responsibility of this Section.
 - .7 Renewals or repairs necessitated by reason of misuse, accidents or negligence not caused by this Section, except ordinary wear and tear, shall not be the responsibility of this Section.

MRL Gearless Traction Elevators

- .8 Supply necessary lubricants, cleaning materials and repair parts required to keep the installation in good working order during this maintenance period.
- .9 Be able to show that the elevator manufacturer and installer has had successful experience in the complete maintenance of elevators and employs competent personnel with EDM-A certification from TSSA, to handle this service.
- .10 Work under this maintenance provision shall be performed by personnel under the supervision and in the direct employ of the elevator manufacturer and installer.
- .11 Provide maintenance and maintain on-site log book in accordance with the elevator code.

1.4 LEED Requirements

- .1 Comply with the requirements of Sections 01352, 01355, 01359, and 01611, as applicable.
- .2 Waste management and disposal:
 - .1 Comply with the waste management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01355. Comply with the directions of the *Contractor's* LEED coordinator with regard to waste management and disposal activities.
- .3 Construction indoor air quality (IAQ) management:
 - .1 Comply with the IAQ management plan developed by the *Contractor* for the *Work* in accordance with Section 01352 and Section 01359. Comply with the directions of the *Contractor's* LEED coordinator with regard to IAQ management activities.
- .4 Recycled Content and Regional Materials:
 - .1 Wherever possible, materials used in work of this Section are to contain high amounts of recycled content and are to be sourced regionally from within 800 km via truck or 2400 km via rail or ship from jobsite in accordance with Section 01611.

1.5 Regulatory Requirements

- .1 In all cases where a device or part of the equipment is herein referred to in the singular manner, it is intended that such reference shall apply to as many such devices as are required to complete the installation.
- .2 Obtain and pay for necessary provincial inspection and permit, except operation or ownership permits and make such tests as called for by the regulations of such authorities. These tests shall be made in the presence of the authorized representatives of such authorities.
- .3 Elevating license:
 - .1 *Provide* and pay for elevating licenses on behalf of *Owner* for first year of operation.

MRL Gearless Traction Elevators

- .4 Be responsible in respect of permits, moneys and dues to be paid due to the trade unions having jurisdiction in regard of the used of elevators during the construction of the project.
- .5 Be registered with the safety authority having jurisdiction at the *Place of the Work*.
- .6 Provide equipment according to seismic zone.

1.6 Non-Proprietary Elevator Equipment and Maintenance Provisions

- .1 Elevator control equipment shall be non-proprietary, or provided with site-specific service tools to render the control equipment non-proprietary.
- .2 Controller interface/service tools shall allow full access to fault codes and maintenance related parameters, with no time limits, and shall allow adjustments, monitoring, and repairs to be performed by any licensed and qualified elevator service provider.
- .3 Controller and/or site-specific service tools shall be provided with user's manual that effectively communicates to a qualified mechanic how to use the controller and/or tool, and also defines and explains all respective error codes.
- .4 Site specific service tools shall remain the property of the building owner.
- .5 Elevator manufacturer shall provide technical training and support upon request to the owner/agent (including other elevator maintenance companies) at a reasonable cost. Cost shall not exceed his then prevailing adjustor mechanic sell rates.
- .6 Parts used in the manufacture, installation and maintenance of this elevator including replacement site specific service tools and manuals shall be available for purchase at fair market value by the owner/agent including their elevator maintenance contractors.

PART 2 - PRODUCTS

2.1 Manufacturer and Installer

- .1 Elevators and equipment of this section shall be manufactured and installed by one company.
- .2 Acceptable manufacturer/installers/*Products*:
 - .1 KONE Inc.
 - .1 Acceptable *Product*: KONE 'Ecospace' gearless traction elevator.
 - .2 Substitutions: Refer to Section 01250.

2.2 Product Availability During Service Life of Elevators

- .1 Elevator materials shall be available on the open market at reasonable market prices during the service life of the elevators. Proprietary materials that are either unavailable or prohibitively priced to other elevator service companies are prohibited.

2.3 Equipment Summary

- .1 Machine: electric gearless traction.
- .2 Control room location:
 - .1 Notify Consultant in writing during bid period whenever required dimensions vary from indicated dimensions.

MRL Gearless Traction Elevators

- .3 Capacity:
 - .1 Elevator No. 1:
 - .1 1588 kg (3500 lbs).
- .4 Rated car speed:
 - .1 0.75 m/s (150 fpm).
- .5 Elevator loading, for Elevator No. ??:
 - .1 Class A – General Freight Loading.
- .6 Operation:
 - .1 Elevator No. 1:
 - .1 Simplex Selective Collective.
- .7 Hall entrances:
 - .1 Entrance type:
 - .1 Single-slide: 1067 mm (3' 6") wide.
 - .2 Entrance height:
 - .1 2134 mm (7' 0")
 - .3 Finish of hall doors and frames:
 - .1 Typical floors:
 - .1 Type 304 stainless steel with No. 4 finish.
 - .2 Ground floor:
 - .1 Type 304 stainless steel with No. 4 finish.
- .8 Hoistway dimensions:
 - .1 Notify Consultant in writing during bid period whenever required dimensions vary from indicated dimensions.
- .9 Stops:
 - .1 Notify Consultant in writing during bid period whenever required dimensions vary from indicated dimensions.
- .10 Cab height:
 - .1 Elevator No. 1:
 - .1 2440 mm (8').
- .11 Pit depth:
 - .1 Notify *Consultant* in writing during bid period whenever required dimensions vary from indicated dimensions.
- .12 Clear overhead dimension:
 - .1 Notify *Consultant* in writing during bid period whenever required dimensions vary from indicated dimensions.
- .13 Signals:

MRL Gearless Traction Elevators

- .1 Car and hall push buttons:
 - .1 Stainless steel: Type 304 with No. 4 finish
- .2 One operating station per car.
- .3 One set of hall push buttons at each landing entrance.
- .4 In-car directional lanterns: mounted on door jamb.
- .5 Position indicator (car): L.E.D. or dot matrix readout type position indicator.
- .6 Audible signals (hall): audible cue to indicate arrival of elevator car, and to indicate which direction the car is travelling.
- .7 Audible signals (car): audible signal shall sound in the car to tell the passenger that the car is either stopping or passing a floor served by the elevator.
- .14 Power supply:
 - .1 600 volt, 3 Phase, 60 Hertz.
- .15 Lighting power supply: 120 Volts, 1 Phase, 60 Hertz.
- .16 Passenger cab:
 - .1 Front return:
 - .1 Stainless steel: Type 304 with No. 4 finish.
 - .2 Wall panels:
 - .1 Stainless steel: Type 304 with No. 4 finish.
 - .3 Handrails on non-access sides:
 - .1 38 mm (1-1/2") diameter rail.
 - .2 Stainless steel: Type 304 with No. 4 finish.
 - .4 Base and reveal trim:
 - .1 Stainless steel: Type 304 with No. 4 finish.
 - .5 Cab doors:
 - .1 Stainless steel: Type 304 with No. 4 finish.
 - .6 Entrance doors:
 - .1 Stainless steel: Type 304 with No. 4 finish.
 - .7 Ceiling:
 - .1 Lighting:
 - .1 LF-94.
 - .2 T-5 fluorescent lighting.
 - .2 Standard translucent panels
 - .8 Car top: steel with unitized construction, finished in white baked-on enamel with ceiling exit.
 - .9 One set of fire resistant protective pads, complete with polished metal pad hooks.

MRL Gearless Traction Elevators

- .10 Double-speed exhaust fan in the car ceiling. Fan noise level shall not exceed 58 dBA above ambient, measured at center of cab.
- .11 Flooring: Coordinate with finish as indicated.
- .17 Special features:
 - .1 Emergency alarm and emergency lighting.
 - .2 Hands-free vandal resistant telephone incorporated into car operating panel.
 - .3 One set of tactile plates at each hall entrance, brushed finish stainless steel and embossed with black coloured raised floor level designations, fastened with flush finished stainless steel fasteners.
 - .4 Provide card access control to Elevator No. 1, integrated with building system security.
 - .5 Special Emergency Devices:
 - .1 Firefighter's Emergency Operation Phase II – Emergency Recall and In-Car Emergency Operation.
 - .2 *Provide* battery powered operation to allow elevator travel to allow passengers to exit elevators where there is power interruption to electrical service.
 - .6 Zoned Access: Equip elevators to permit operation of the car with the hoistway door opening at top and bottom landings, in order to permit access to the top of the car or to the pit.
 - .7 Independent Service: Equip elevators for keyed independent service operation.
- .18 Emergency battery power supply:
 - .1 When the main line power is lost for longer than 5 seconds the emergency battery power supply provides power automatically to the elevator controller. The elevator will rise or lower to the first available landing, open the doors, and shut down. The elevator will return to service upon the return of normal main line power.

2.4 Battery Powered Emergency Lighting

- .1 Include emergency lighting in the car as follows:
 - .1 Use battery operated emergency lighting equipment to CSA C22.2 No. 141-02 to provide general illumination and 10 Lx minimum illumination in car at operating panel and telephone cabinet for 4 hours minimum.
 - .2 Include means for convenient manual operation and testing of the unit from the car station.
 - .3 Design battery unit of sufficient strength to support 90 kg (198 lbs) person without causing malfunction or damage.
 - .4 Include means of containing any leakage or spillage of electrolyte.
 - .5 Arrange battery unit as a source of power for alarm bell during power failure.
 - .6 Emergency light unit is to be an integral part of the car operating panel.

MRL Gearless Traction Elevators

2.5 Telephone/Auto Dialler and Car Service Cabinets

- .1 Elevator telephone system shall be on its own phone line.
- .2 Elevator telephone system shall meet the elevator code requirements for car emergency signalling devices, and shall be able to establish voice communications between a passenger and a person outside the hoistway in a location in the building that is readily accessible to authorized and emergency personnel.
- .3 In the event that the building telephone is not answered, design elevator telephone system to automatically re-direct call within 30 seconds to an additional on- or off-site location, staffed by authorized personnel where an appropriate response can be taken.
- .4 Elevator telephone system shall be provided with user-programmable auto-dial memory, powered by telephone line, pulse or tone, car cab ringer to accept incoming calls, automatic shut-off.
- .5 Telephone shall initially be programmed to ring through to locations as determined by *Consultant*.

2.6 Independent Service

- .1 Include independent service by means of key-operated switch in car operating panels to allow removal of a car from service and to operate in response to car calls only and as follows:
 - .1 Open doors automatically upon arrival.
 - .2 Render door protective services inoperative.
 - .3 Render hall signals inoperative.

2.7 Simplex Operation

- .1 The elevator shall be automatic by means of the car buttons and one riser of hall buttons. Car will operate either up or down to answer their car calls in sequence as the floors are reached. Any car travelling in answer to a car call shall stop for hall calls which are registered in the direction of travel.

2.8 Materials

- .1 Steel:
 - .1 Sheet steel for exposed work: Stretcher-levelled, cold-rolled, commercial-quality carbon steel, complying with ASTM A1008/A1008M-07, matte finish.
 - .2 Sheet steel for unexposed work: Hot-rolled, commercial-quality carbon steel, pickled and oiled, complying with ASTM A1011/A1011M-06b.
 - .3 Structural steel shapes and plates: ASTM A36 and AISI 1018.
- .2 Stainless steel: Type 300 Series complying with ASTM A167-99(2009), with standard tempers and hardness required for fabrication, strength and durability.
 - .1 Supply with mechanical finish on fabricated work in the location shown or specified with texture and reflectivity required (Federal and NAAMM nomenclature). Protect with adhesive plastic film or paper covering.
 - .2 Finish:
 - .1 No. 4 satin finish.

MRL Gearless Traction Elevators

- .3 Aluminum: Extrusions per ASTM B221-08; sheet and plate per ASTM B209-07.
- .4 Plastic laminate: ASTM E84-09c Class B and NEMA LD3, 1.3 mm (0-1/20") up to 1.6 mm (0-1/16") nominal thickness.
- .5 Fire-retardant treated particleboard panels: Minimum 0-1/2" (13 mm) thick backup for plastic laminate veneered panels, provided with suitable anti-warp backing; to meet ASTM E84-09c Class "A" rating with flame-spread rating of 25 or less.
- .6 Paint:
 - .1 Unexposed steel and/or iron: Clean metal of oil, grease, scale and other foreign matter and paint one shop coat of manufacturer's standard rust-resistant primer. Galvanized metal need not be painted.
 - .2 Clean exposed metal of oil, grease, scale and other foreign matter from exposed steel. Remove dents, scratches, or other defects that would affect the final finish. For material delivered with primer coat only, apply manufacturer's standard enamel primer. For material delivered with a finish coat apply 2 coats of manufacturer's standard enamel of a color selected by the architect from the manufacturer's standard color selection.
- .7 Non-shrink, non-metallic grout: Factory-packaged, non-staining, non-corrosive, nongaseous, non-metallic grout complying with ASTM C1107/C1107M-08.

2.9 Equipment – Control Room Components

- .1 Controller: A microcomputer based control system shall be provided to perform all of the functions of safe elevator operation. The system shall also perform car and group operational control.
 - .1 High voltage (110V or above) contact points inside the controller cabinet shall be protected from accidental contact in a situation where the controller doors are open.
 - .2 Controller shall be separated into two distinct halves; Motor drive side and control side. High voltage motor power conductors shall be routed so as to be physically segregated from the rest of the controller.
 - .3 Field conductor terminations points shall be segregated; high voltage (>30 volts DC and 110 VAC) and low voltage (< 30 volts DC).
 - .4 Controllers shall be designed and tested for Electromagnetic Interference (EMI) immunity according to the EN 12016 (May 1998): "EMC Product Family Standards for lifts, escalators, and passenger conveyors Part 2 – immunity".
- .2 Drive: A Variable Voltage Variable Frequency AC drive system shall be provided.

2.10 Equipment – Hoistway Components

- .1 Machine: AC gearless machine, with a synchronous permanent-magnet motor, dual solenoid service and emergency disc brakes.
- .2 Machine location:
 - .1 Notify Consultant in writing during bid period whenever required dimensions vary from indicated dimensions.
- .3 Governor: The governor shall be a tension type governor.

MRL Gearless Traction Elevators

- .4 Hoistway operating devices:
 - .1 Emergency stop switch in pit.
 - .2 Terminal stopping switches.
- .5 Positioning system: Consists of an encoder, reader box, and door zone vanes.
- .6 Guide rails and attachments: Steel rails with brackets and fasteners.
- .7 Coated steel belts; as applicable to Otis product: Polyurethane coated belts with high-tensile-grade, zinc-plated steel cords.
- .8 Governor rope: Governor rope shall be steel and shall consist of at least eight strands wound about a sisal core centre.
- .9 Fascia: Galvanized sheet steel shall be provided at the front of the hoistway.

2.11 Buffers

- .1 Car and counterweight, where required by elevator code.

2.12 Motor

- .1 The motor shall be designed and built expressly for elevator service with a high starting torque and low starting current. The motor armature shall be dynamically balanced and supported by ball bearings of ample capacity.

2.13 Brake

- .1 The electric brake shall be spring applied. It shall be held open by an electro-magnet actuated by the controller and designed to make smooth, positive stops. It shall be designed to automatically apply in event of interruption of power supply for any cause.

2.14 Signals and Controls

- .1 Operating panel and signalling devices shall be 'Barrier Free' accessible to applicable regulations.
- .2 Car operating panel:
 - .1 A full swing operating panel pierced to contain the devices required shall be installed in the front return panel of each car and shall contain the devices required for the specified operation, and to meet Code requirements.
 - .2 Floor buttons in the car station shall illuminate when a call is registered, and remain illuminated until the particular car stop has been made.
 - .3 Call buttons: stainless steel, complete with black painted stainless steel Braille.
- .3 Landing buttons: Provide impulse riser of landing pushbutton stations. Each intermediate station to consist of two illuminated stainless steel pushbuttons with raised direction arrows.
 - .1 Furnish stainless steel plates with the following finish:
 - .1 No. 4.
 - .2 Provide call buttons with black painted stainless steel Braille.
- .4 Position indicator:

MRL Gearless Traction Elevators

- .1 In the elevator cab header, a surface mounted digital readout position indicator shall be provided.
- .5 Hall position indicator:
 - .1 The cover plate shall be finished in satin lustre stainless steel and shall be securely mounted.
 - .2 Provide audible cue to indicate arrival of elevator car, and to indicate which direction the car is travelling.
- .6 Directional lanterns: *Provide* directional lanterns in accordance with the elevator code, as follows:
 - .1 *Provide* units with illuminated arrows, but *Provide* single arrow at terminal landings with illuminated elements projecting from faceplate for ease of angular viewing.
 - .2 Provide units with flat faceplate for mounting with body of unit recessed in wall or jamb.
 - .3 The faceplate shall be furnished in satin lustre stainless steel and shall be securely mounted.
 - .4 In-car directional lanterns: mounted on door jamb.
- .7 Audible car signals: An audible signal shall sound in the car to tell passengers that the car is either stopping or passing a floor served by the elevator.
 - .1 A 20 db, 1500 Hz maximum frequency tone to be emitted upon arrival at each floor level. Provide 1 tone to indicate that car is travelling up, and 2 tone to indicate that car is travelling down.
- .8 Provide colour/brightness contrasted raised Arabic and Braille numerals and universal symbols to meet elevator code requirements, to hoistway and hall control buttons.

2.15 Doors and Entrances

- .1 Door operation:
 - .1 A direct current motor driven operator shall be furnished and installed, designed to operate the car and hoistway doors simultaneously at a maximum opening speed of 610 mm/s (24 inches/sec) and a maximum closing speed of 300 mm/s (11.8"). Door movements shall be electrically cushioned at both limits of travel and the door operating mechanism shall be arranged for manual operation in the event of power failure.
 - .2 The leading edge of the car door shall be provided with "Lambda" or "Panaforty" Safety Edge System, arranged to automatically return the car and hoistway doors to the open position in the event the doors edge system detects an obstruction, for the full height of door, during the closing cycle, in accordance with the elevator code. The doors shall automatically open as the car arrives at the landing and shall automatically close after an adjustable time interval or when the car is dispatched to another landing.
 - .3 Door operation shall include nudging feature as per the elevator code. If the door detector is operated continuously for more than 20 seconds, close the doors slowly under reduced speed and force, and actuate an audible warning signal.

MRL Gearless Traction Elevators

- .4 Direct drive geared operators, AC controlled units with oil checks, or other deviations from the above are not acceptable.
- .2 Door hangers and tracks:
 - .1 For each hoistway sliding door, furnish sheave type two point suspension hangers and tracks complete.
 - .2 Nylon sheave shall not be less than 75 mm (3") in diameter with ball bearings properly sealed to retain grease. Hangers shall be provided with an adjustable roller to take the up-thrust of the doors. Tracks are to be formed steel shapes with smooth surfaces and shaped to conform to the hanger sheaves.
- .3 Door type:
 - .1 Doors shall be formed from not less than 1.5 mm (0.06") 16 gauge sheet metal for front panels, and for hoistway side satin coat steel panels shall be flush and separated by suitable steel reinforcing. Door edges shall be filled and finished smooth. Provide bottom of doors with proper guides of composite material to operate in sill slots with minimum clearance. Guides shall allow for lateral adjustment of hall doors in both directions (away from or in towards the rear hoistway wall). Top of doors shall be reinforced and be capable of carrying weight of door and hanger pendant bolts.
 - .2 Hoistway door operation shall be smooth. Design door equipment to operate with minimum noise.
- .4 Interlocks:
 - .1 Each hoistway entrance shall be equipped with an approved type interlock tested as required by Code.
 - .2 The interlock shall be designed to prevent operation of the car away from the landing until the doors are locked in the closed position as defined by elevator code, and shall prevent opening the doors at any landing from the corridor side unless the car is at rest at that landing or is in the levelling zone and stopping at that landing.
- .5 Hoistway door unlocking device:
 - .1 Hoistway door unlocking devices, required by the elevator code shall be provided to permit authorized persons to gain access to the hoistway when the elevator car is away from the landing.
- .6 Entrance frames: 90 minute fire resistance rated, with label.
- .7 Sills:
 - .1 Extruded aluminum, non-slip wearing surface.
 - .2 Recess the extruded threshold plate to accommodate floor finishes.

2.16 Sling

- .1 The sling shall consist of heavy steel channel stiles, properly affixed to a steel crosshead and safety channels with adequate bracing members to remove all strain from the car enclosure.

MRL Gearless Traction Elevators

2.17 Structural Shapes for Support of Various Elevator Components

- .1 Provide structural-steel shapes for entrance frames.
- .2 Refer to Section 05500 for the following items:
 - .1 Pit ladders.
 - .2 Hoist beams.

PART 3- EXECUTION

3.1 Preparation

- .1 Take field dimensions and examine conditions of substrates, supports, and other conditions under which this work is to be performed. Do not proceed with work until unsatisfactory conditions are corrected.

3.2 Guide Rails and Brackets

- .1 Erect guide rails plumb and parallel within maximum deviation of 6 mm (1/4").
- .2 Use metal shims only to a maximum of 25 mm (1") and provide lock washers under nuts and tapped bolts.
- .3 Compensate for expansion and contraction of guide rails.
- .4 Use splice plates and guide rails with contact surfaces accurately machined to form smooth joints. Clean running faces guide rails before final acceptance.
- .5 Properly locate guide rails and related supports at locations in accordance with manufacturer's recommendations and approved shop drawings. Anchor to building structure using isolation system to minimize transmission of vibration to structure.

3.3 Installation

- .1 Comply with manufacturer's written instructions.
- .2 Set entrances true with plumb hoistway lines.
- .3 Erect elevator closures in accordance with labelling requirements.
- .4 Exposed work in cars and at entrances shall be fabricated in true planes, flat and straight, free of buckles, waves and other visible imperfections such as "oil canning". Joints shall be accurately fitted and properly aligned. Conceal fasteners. Welds shall be undetectable in finished work.
- .5 Lubricate operating parts of systems, including ropes (if required), as recommended by manufacturers.
- .6 Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts designed to minimize transmission of vibrations to structure and thereby minimize structure-borne noise from elevator system.
- .7 Welded Construction: Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts.

MRL Gearless Traction Elevators

- .8 Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with car. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.
- .9 Set sills flush with finished floor surface at landing. Fill space under sill solidly with non-shrink, non-metallic grout.
- .10 Remove dust and debris from machine rooms, elevator cars (interior and exterior), and elevator pits.
- .11 Perform fine tuning and adjusting to comply with the elevator code and this specification section.

3.4 Operating Performance

- .1 Levelling Tolerance (stopping accuracy): Adjust to within 5 mm (0.2 in.) of floor finish level under rated loading to zero loading conditions and both directions of travel.
- .2 Ride quality - Arrange that the lateral acceleration (front to rear and side to side) measured during express runs is less than:
 - .1 Vertical Vibration (maximum): 25 milli-g
 - .2 Horizontal Vibration (maximum): 255 milli-g
 - .3 Vertical Jerk (maximum): 1.3 ft/sec³.
- .3 Noise:
 - .1 In Car noise: within 50 – 55 dB(A)
 - .2 Measure the noise levels using sound level meter set to the "A" scale for a fast response.
- .4 Performance
 - .1 Car speed: within 3% of contract speed under full range of loading conditions and direction of travel.
 - .2 Car capacity: Safely lower, stop and hold up to 125% of rated load. (code required).

3.5 Touch Up

- .1 Upon completion, touch-up and restore to new condition any damaged or defaced factory finished surfaces.
- .2 Remove protective covering and clean exposed surfaces after completion and leave in undamaged condition.
- .3 Include in price for re-buffing stainless steel doors, after move-in, and finishes are installed.

3.6 Quality Control

- .1 Acceptance Testing: On completion of elevator installation and before permitting use (either temporary or permanent) of elevators, perform acceptance tests as required by governing regulations and agencies.

MRL Gearless Traction Elevators

- .2 Supply instruments and carry out performance checks of equipment, including control and operation system. Performance check shall be done in presence of *Consultant* and *Owner*. Notify *Consultant* and *Owner* in writing, at least 1 week prior to date of performance and operational inspection. This section shall be responsible for additional tests required because of outstanding deficiencies.
- .3 Submit test and approval certificates issued by jurisdictional authorities.

3.7 Demonstration

- .1 Instruct *Owner's* personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train *Owner's* personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.
- .2 Make a final check of each elevator operation, with *Owner's* personnel present, immediately before date of *Substantial Performance of the Work*. Determine that control systems and operating devices are functioning properly.
- .3 Check operation of each elevator with *Owner's* personnel present not more than one month before end of warranty period. Determine that operation systems and devices are functioning properly.

END OF SECTION