OPENINGS GENERAL REQUIREMENTS

1. GENERAL

1.1 Summary

.1 This Section specifies the general requirements for doors and windows.

.2 Refer to Appendix 18J Room Data Sheet for additional requirements.

1.2 Standards

.1 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):

.1 ASHRAE 90.1 - Energy Standard for Sites and Buildings Except Low-Rise Residential Buildings.

1.3 Submittals

.1 Submit product data in accordance with Sections 01300 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Submit Shop Drawings with Manufacturer’s printed product literature, specifications and data sheets for each type of product specified. Indicate general construction of each type of product, configurations, material, material thickness, jointing methods, mortises, reinforcements, anchorage details, arrangement of hardware, fire ratings, finish and special features.

.3 Indicate materials and details in full size scale for head, jamb and sill, profiles of components, interior and exterior trim, description of related components, exposed finishes, fasteners, and caulking. Indicate location of Manufacturer's nameplates.

.4 Submit the following test and engineering data, and Manufacturer’s installation instructions prior to installation:

.1 Quality assurance documentation as specified in this Section.

.2 Door, frame, hardware and glazing schedules.

.3 Samples:

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

.2 After review, samples are to be returned for incorporation in the Work.

.4 Hardware List:

.1 Submit a hardware list.

.2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.

2. PRODUCTS

2.1 Performance Criteria

.1 Doors:

.1 Provide doors that suit the intended function of spaces or rooms requiring acoustic or visual privacy, security, special HVAC requirements, fire-resistance rated separations or other closures.

.2 Exterior doors to meet the requirements of American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 90.1 current version at time of building permit application.

.3 Size requirements:

.1 Provide door openings of adequate width to suit the intended purpose of rooms on either side of the doors and allow the movement of people and equipment associated with those rooms.

.2 Minimum door width to be 965 mm.

.3 Provide adequately sized double doors into rooms where large pieces of equipment will be moved in or out during the lifetime of the Facility, including all mechanical and electrical rooms.

.4 Doors to have a minimum height of 2135 mm.

.4 Acoustic requirements for doors: refer to the acoustic requirements in Appendix 18D City Standards.

.5 Apply door sizes and designs consistently to rooms of similar use, location, and configuration.

.6 Doors shall not swing into corridors to obstruct traffic or reduce the corridor width, except doors to rooms that are not subject to occupancy, such as small closets.

.7 Doors shall not to have floor-mounted tracks. Rails or slides and locking devices shall not penetrate the floor (top mount only).

.8 Pocket doors are not permitted.

.9 Wood doors shall be limited to interior use. Wood doors shall not be used for public and process areas. Use semi-transparent or clear finish to veneer on wood doors in staff support areas.

.10 Metal doors shall be used for service areas where collisions with doors is likely. Metal doors shall be used in all information technology, telecommunications, and main equipment rooms, maintenance shops and all process areas.

.11 Provide steel frames in high equipment traffic areas.

.12 Door and frame finish shall be resistant to smudges, dirt or oil from casual contact.

.13 Glazing requirements for doors:

.1 Doors in circulation zones and at fire separations shall have at a minimum narrow vision lights for safety and visibility into adjacent rooms.

.2 Door glazing for staff support areas shall consider the extent of visibility and the privacy of the occupants of the room.

.3 Glazing in doors is required to allow for proper security, sight lines and natural lighting.

.14 Doors and door frames shall withstand the varying and high levels of humidity and impacts typical to wastewater treatment plants and maintain their aesthetics and functionality.

.15 Where security is required, location, configuration, materials, construction, and detailing of the door and hardware shall provide the degree of security appropriate for that door's location.

.2 Interior Windows:

.1 Size, configure, and adequately construct windows to suit rooms that require daylight, views or natural ventilation. Provide borrowed light through interior windows to occupied rooms that do not have daylight.

.2 Coordinate glazing heights with adjacent wall protection, handrails, and other accessories for functional and aesthetic cohesiveness.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer’s recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

END OF SECTION

DOORS AND FRAMES

1. GENERAL

1.1 Summary

.1 This Section specifies doors and frames.

1.2 Standards

.1 National Fire Protection Association (NFPA):

.1 NFPA 80-99 - Standard for Fire Doors and Fire Windows.

.2 NFPA 252-03 - Standard Methods of Fire Tests of Door Assemblies.

.2 Canadian Steel Door Manufacturers Association (CSDMA):

.1 CSDMA Recommended Specifications for Commercial Steel Doors and Frames, 2000.

.2 CSDMA Selection and Usage Guide for Commercial Steel Doors, 1990.

.3 Canadian Standards Association (CSA):

.1 CAN/CSA-O132.2 Series – 90 Wood Flush Doors.

.4 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):

.1 ASHRAE 90.1 - Energy Standard for Sites and Buildings Except Low-Rise Residential Buildings.

.5 Architectural Woodwork Manufacturers Association of Canada (AWMAC) Standards.

.6 Door and Hardware Institute (DHI) Standards.

1.3 Submittals

.1 Submit product data in accordance with Sections 01300, 08000 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Shop Drawings:

.1 Provide Shop Drawings and a schedule of doors and frames. Schedule shall follow door numbering established by the Final Design and hardware schedule.

.2 Clearly indicate each type of door and frame, materials, thicknesses, sizes, reinforcements, glazing, stops and openings.

.3 Co-ordinate with hardware supplier to ensure all aspects such as undercut of doors of this Section are compatible with door sill types specified.

2. PRODUCTS

2.1 Performance Criteria

.1 Hollow metal doors and frames:

.1 Materials and manufacture of metal doors shall comply with the requirements of the Canadian Steel Door Manufacturer's Association (CSDMA).

.2 Provide interior metal doors with flush-face construction, fully welded and smooth seams.

.3 Provide fire-labelled doors for those openings requiring fire protection ratings, as scheduled.

.4 Exterior metal doors:

.1 Comply with current ASHRAE 90.1 requirements and have the following features:

.1 Flush face construction, face sheet continuously welded, seamless edges and construction using stiffened 1.6 mm steel sheet.

.2 Prepared surfaces shall receive weather and corrosion-resistant finishes. Provide wipe coated (Z275) galvanized coating.

.3 An insulated core to a minimum of R12 (RSI 2.2) with bonded polyurethane core.

.4 Capped to avoid water collecting in welding channels.

.5 Special finish coatings for chemical areas.

.6 Hinges will be institutional grade ball bearing butts, with exposed hinge pins pinned to prevent removal.

.2 Include weather stripping, thresholds, rim-mounted secure panic devices, door closers, locks and access controls as required.

.5 Interior metal doors:

.1 Interior doors shall be painted, hollow metal with zinc wipe coated galvanized steel with honeycomb or polyurethane insulated cores in pressed steel frames and oversized where required.

.2 Door hardware shall be heavy- or medium-duty and corrosion resistant depending on location and severity of use.

.3 Door glazing shall be clear tempered glass or wired diamond mesh glass for fire rated areas.

.6 Provide pressed metal frames with:

.1 Fully welded construction with 1.9 mm metal core thickness.

.2 Thermally-broken door frames for non-fire rated exterior locations and foam filled tied into air vapour barrier membrane.

.3 For exterior frames, prepare surfaces to receive finishes that resist corrosion from exposure to weather. Provide ZF180 galvannealed coating.

.4 Anchors to each jamb to suit wall type and receive the frame.

.5 Metal frames shall be heavy or medium duty and corrosion resistant depending on location and severity of use.

.7 Door Glazing:

.1 For exterior hollow metal door, glaze using sealed units with warm edge, space in thermally broken frames to prevent heat loss.

.2 Use tempered glass for interior hollow metal door glazing.

.2 Wood Doors:

.1 Wood doors shall have hardware and finishes that are durable and suited for their location and function.

.2 All wood door edges must be sealed.

.3 Construct, finish, and install wood doors to minimize maintenance and resulting disruption to normal activities and operations.

.4 Provide wood doors in flush design, to AWMAC Custom Grade.

.5 Wood doors shall be CAN/CSA-O132.2 Series - 90; 44 mm thick, solid core of wood strips or wood particle Type 1, Density C, Class 1. Face veneers shall be 3 mm white birch suitable for a paint (clear) finish. Stiles shall be hardwood to AWMAC custom grade edge detail #3, stiles minimum 38 mm wide, rails minimum 63 mm wide, stiles and rails securely bonded to the core with adhesive, then sanded as a complete assembly prior to the application of the faces. Metal edges are not permitted. Adhesives shall be type I waterproof.

.6 Composite wood products and laminating adhesives used in wood doors shall not to contain urea formaldehyde resins.

.7 Provide fire-rated doors with a homogeneous non-combustible mineral core and AWMAC Quality Standards Option 5 blocking.

.8 Glue stiles, rails and faces to the core with Type II water-resistant adhesive to minimize de-lamination or disassembly as a result of moisture ingress.

.9 In staff support areas, provide wood doors with B-Grade hardwood veneer with AWMAC No. 3 edge, finish to suit the intended use.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer's recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

.3 Install labelled steel fire-rated doors and frames conforming to NFPA 80 except where specified otherwise.

.4 Install doors and frames to conforming CSDMA Installation Guide.

END OF SECTION

ACCESS HATCHES

1. GENERAL

1.1 Summary

.1 This Section specifies the furnishing and installing of factory-fabricated aluminum single-leaf and double-leaf access hatches at vault and other concrete covers.

1.2 Submittals

.1 Submit product data in accordance with Sections 01300, 08000 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Shop Drawings and product specifications, including instructions for the storage, handling, installation, and operation of the access covers and telescopic safety post.

.3 Provide structural calculations sealed by a Professional Engineer for the access door cover design.

2. PRODUCTS

2.1 Manufacturers and Products

.1 Acceptable Manufacturers:

.1 Bilco.

.2 MSU Mississauga Ltd.

.3 Or approved equivalent.

2.2 Performance Criteria

.1 Access Doors:

.1 Minimum sizes:

.1 Refer to Drawings for equipment removal or replacement.

.2 Refer to Schedule 18 for minimum hatch sizes.

.2 Construction: Rounded safety corners, concealed hinges, screwdriver latch, anchor straps, able to open 180°.

.3 Materials: Use aluminum diamond pattern plate complete with stainless steel type AISI 316 hardware.

.4 Nominal opening sizes and hinge opening side shall be as specified in the Final Design.

.5 Door leaf shall be 6 mm aluminium with diamond pattern reinforced to support a minimum live load of 130 kg (1275 N) with a maximum deflection of 1/150 of the span. Loading criteria for each hatch shall be as specified in the Final Design.

.6 Channel frame shall be minimum of 6 mm extruded aluminium with bend-down anchor tabs around the perimeter. A continuous ethylene propylene diene monomer (EPDM) gasket shall be mechanically attached to the aluminium frame to create a barrier around the entire perimeter of the cover and reduce the dirt and debris that may enter the channel frame.

.7 All access hatches shall have fall protection grating.

.8 Provide drainage channel all around with 38 mm drainage coupler as necessary.

.9 Exterior hatches shall be lockable.

.10 Hatches shall open 90° and lock automatically in that position and provided with a slam lock with removable key wrench and safety chain.

.2 Finishes:

.1 Access hatch shall be mill finish aluminium with bituminous coating to exterior of the frame and anchors.

.2 Finish of telescopic safety post shall be black enamel.

.3 Stamp or weld the load rating onto cover.

.3 Lifting Mechanism and Hardware:

.1 Manufacturer shall provide the required number and size of compression spring operators enclosed in telescopic tubes to provide smooth, easy, and controlled cover operation throughout the entire arc of opening and to retard downward motion of the cover when closing. Springs shall have an electrocoated acrylic finish. Spring tubes shall be constructed of a reinforced nylon 6/6-based engineered composite material. The upper tube prevents accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube interlocks with a flanged support shoe fastened to a formed 6 mm gusset support plate. Covers shall be equipped with a hold-open arm which automatically locks the cover in the open position. A removable exterior turn-lift handle with a spring loaded ball detent shall open the cover and the latch release shall be protected by a flush, gasketed, removable screw plug. A Type 316 stainless steel snap lock with fixed handle shall be mounted on the underside of the cover.

.2 Heavy forged aluminium hinges, each having a minimum 6 mm diameter Type 316 stainless steel pin, shall be provided to pivot so the cover does not protrude into the channel frame. Hinges shall be specifically designed for horizontal installation and through-bolted to the cover with tamperproof Type 316 stainless steel lock bolts and through-bolted to the frame with Type 316 stainless steel bolts and locknuts.

.4 Telescopic Safety Post:

.1 Each vault where an access hatch is installed shall be fitted with a telescopic safety post manufactured of mill finish aluminium and designed to be fastened to manhole-type rungs. Posts shall have a telescopic tubular section that locks automatically when fully extended. Upward and downward movement shall be controlled by a stainless steel spring balancing mechanism.

.2 Acceptable Product:

.1 Bilco LadderUP Model LU-4.

.2 Or approved equivalent.

.5 Safety Chain:

.1 Provide a corrosion-resistant safety chain that spans the corners of the hatch doors when open.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer's recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

.3 Frame shall be accurately cast-in-place and securely anchored to concrete.

END OF SECTION

SPECIALTY DOORS AND FRAMES

1. GENERAL

1.1 Summary

.1 This Section specifies the provision of specialty doors and frames.

1.2 Submittals

.1 Submit product data in accordance with Sections 01300, 08000 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Indicate each type of door and grille, arrangement of hardware, required clearances, electrical characteristics including voltage, size of motors, auxiliary controls and wiring diagrams.

.3 Submit 400 mm long sample of grille or rod door to be used for visual access to secure areas.

.4 Indicate assembly details and dimensions of fabrication, required clearances and electrical connections.

2. PRODUCTS

2.1 Performance Criteria

.1 Specialty Doors:

.1 Overhead Rolling Service Doors:

.1 Provide interlocking flat slats, complete with bottom bar and contact type bottom astragal.

.2 Provide motor operation on all overhead service doors.

.3 For fire doors, provide automatic closing device operated by fire door release device connected to the fire alarm system.

.4 Provide enclosure for door mechanisms that blends with the interior finishes.

.5 In exterior applications, provide frames that are thermally broken and achieve minimum rating of R7.0.

.2 Overhead Rolling Fire Shutters:

.1 Provide shutter curtains fabricated with extruded aluminum or stainless steel interlocking flat slats, complete with guides of similar materials.

.2 Provide closures that are manually operated and include locking capability. Provide key locking mechanism on room side at “garage door” applications.

.3 Overhead sectional doors:

.1 Provide metal overhead sectional doors which are guided by movement in sections.

.2 All overhead doors shall be insulated, flush-faced metal to a minimum of R25 (RSI 4.4) and complete with three (3) vision panels.

.4 All overhead doors shall be motorized and equipped with fog-proof backup safety sensors.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer's recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

END OF SECTION

ENTRANCES, STOREFRONTS AND CURTAIN WALLS

1. GENERAL

1.1 Summary

.1 This Section specifies the provision of entrances, storefronts and curtain walls.

1.2 Submittals

.1 Submit product data in accordance with Sections 01300, 08000 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Product Data: Include construction details, material descriptions, and fabrication methods, dimensions of individual components and profiles, hardware, finishes, and installation instructions for each type of aluminum-framed entrance door, storefront and curtain wall indicated.

.3 Shop Drawings: Include plans, elevations, sections, details, hardware, and attachments to other work, operational clearances and installation details.

.2 Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.

.3 Samples for Verification: For sliding aluminum-framed glass door and components required.

.4 Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for each type, class, grade, and size of aluminum-framed entrance doors. Test results based on use of downsized test units are not acceptable.

.5 Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 300 mm lengths of full-size components and showing details of the following:

.1 Joinery, including welds.

.2 Anchorage.

.3 Expansion provisions.

.4 Glazing.

.6 Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

1.3 Standards

.1 Aluminum Association Standards (AAS).

.2 American Architectural Manufacturers Association (AAMA) Field Testing Specifications.

.3 National Building Code (NBC).

.4 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):

.1 ASHRAE 90.1 - Energy Standard for Sites and Buildings Except Low-Rise Residential Buildings.

2. PRODUCTS

2.1 Performance Criteria

.1 Entrances and curtain wall systems to be tested in place for conformance to the building envelope Final Design.

.2 Aluminum entrances:

.1 Aluminum framing may form part of exterior envelopes at entrances protected from the weather.

.2 Provide glazed aluminum storefront interior partitions to comply with the functions of the spaces.

.3 Use aluminum doors within aluminum curtain wall and storefront.

.4 Use aluminum swing entrance doors that are heavy-duty commercial or institutional grade that may be automatically operated, motion-detector controlled.

.1 Use automatic swing doors for interior and exterior locations including entrances, and doors to exterior spaces that are required to be handicapped accessible where required for the Final Design.

.2 Provide directional motion sensor control device that are unaffected by ambient light or ultrasonic frequencies at automatic swing doors.

.3 Equip all in-swing doors that are required exits with an emergency breakaway switch that internally cuts power to the operator. No external power switch allowed.

.5 Use frames that are thermally-broken flush-glazed aluminum sections, to accept insulating glass units.

.6 Apply aluminum finish for exposed aluminum surfaces. For exposed aluminum surfaces, provide a finish that is permanent and resistant to corrosion resulting from weather exposure, minimum Class 1 for anodized coatings.

.7 For interior aluminum surfaces, provide a finish with minimum Class 2 anodized coatings.

.8 Provide assemblies that resist climatic and seismic events specified where required.

.3 Aluminum curtain walls:

.1 Curtain wall framing is to incorporate a drained and vented system complete with air and vapour seal, allowing any water entering the framing/system and the glazing detail cavities to drain to the exterior and also allowing air into the pressuring chamber.

.2 Provide curtain wall framing with thermal breaks.

.3 For exposed aluminum surfaces, provide a finish that is permanent and resistant to corrosion resulting from weather exposure.

.4 Provide assemblies that resist climatic and seismic events as required for the Final Design.

.5 Provide fire stopping at the joint between the curtain wall and floor slab.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer's recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

END OF SECTION

WINDOWS

1. GENERAL

1.1 Summary

.1 This Section specifies windows.

1.2 Standards

.1 Aluminum Association Standards (AAS).

.2 American Architectural Manufacturers Association (AAMA) Field Testing Specifications.

.3 National Building Code (NBC).

.4 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):

.1 ASHRAE 90.1 - Energy Standard for Sites and Buildings Except Low-Rise Residential Buildings.

.5 Canadian Standards Association (CSA):

.1 CSA-A440/A440.1, A440, Windows / Special Publication A440.1, User Selection Guide to CSA Standard A440, Windows.

.2 CAN/CSA-Z91, Safety Code for Window Cleaning Operations.

1.3 Submittals

.1 Submit product data in accordance with Sections 01300, 08000 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.

.3 Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 300 mm lengths of full-size components and showing details of the following:

.1 Joinery, including welds.

.2 Anchorage.

.3 Expansion provisions.

.4 Glazing.

.4 Submit test reports from approved independent testing laboratories, certifying compliance with Specifications, for:

.1 Windows classifications.

.2 Airtightness.

.3 Watertightness.

.4 Wind load resistance.

.5 Condensation resistance.

2. PRODUCTS

2.1 Performance Criteria

.1 Aluminum Windows:

.1 Incorporate a drained and vented system complete with air and vapour seal, allowing any water entering the framing/system and the glazing detail cavities to drain to the exterior and also allowing air into the pressuring chamber.

.2 Double-glaze or triple-glaze all exterior windows. Reference Section 08800.

.3 Provide windows that incorporate a thermal break that is resistant to corrosive atmosphere on the interior and exterior of the window.

.4 For exposed aluminum surfaces, provide a finish that is permanent and resistant to corrosion resulting from weather exposure, minimum Class 1 for anodized coatings.

.5 For interior aluminum surfaces, provide a finish with minimum Class 2 anodized coatings.

.6 Ensure surfaces are corrosion resistant to the interior atmosphere.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer's recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

.3 Aluminum windows to be tested in place for conformance with building envelope design to meet the requirements of Section 07200.

END OF SECTION

DOOR HARDWARE

1. GENERAL

1.1 Summary

.1 This Section specifies door hardware.

1.2 Submittals

.1 Submit product data in accordance with Sections 01300, 08000 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Submit Shop Drawings complete with detailed hardware schedule indicating manufacturer's name and article number in complete detail including active hands of pairs of doors, degree of opening and other information pertinent to the intended function of the door and frame details.

.3 Submit detailed hardware schedule with the shop drawings. In addition to hardware, the schedule is to include, for each heading or group of doors, a door reference number, the room designations, door size and material and label requirements. The schedule is to incorporate detailed keying in accordance with City Standards.

.4 Provide "as-installed" hardware list, including name of supplier, sixty (60) days prior to Substantial Completion.

.5 List to be complete with key to explain manufacturer's names, abbreviations and codes.

.6 Templates are not to be issued or material supplied until the hardware list has attained “Received” status in accordance with Schedule 5.

1.3 Standards

.1 American National Standards Institute (ANSI).

.2 Builders Hardware Manufacturers Association (BHMA).

.3 Canadian Steel Door Manufacturers Association (CSDMA).

.4 Architectural Woodwork Manufacturers Association of Canada (AWMAC) Standards.

.5 Door and Hardware Institute (DHI) Standards.

.6 Canadian Standards Association (CSA):

.1 CAN/CGSB-69.35/ANSI/BHMA A156.19, Power Assist and Low Energy Power Operated Doors.

.7 Appendix 18D City Standards.

2. PRODUCTS

2.1 Performance Criteria

.1 Finish Hardware:

.1 Provide all finish hardware as required by the City Standards.

.2 Provide security plan illustrating lines of security and types of hardware proposed at all doors/access and in accordance with City Standards.

.3 Hardware shall be fully integrated with the security requirements of the NEWPCC Access Control Guideline found in Appendix 18D and coordinated with electrical wiring and power requirements.

.4 Provide and coordinate finish hardware in conformance with City Standards. Security to be compatible with standards for a post-disaster building and functional operation.

.5 Finishes shall provide maximum longevity.

.6 Provide ULC-listed hardware for the required fire rating.

.7 Use heavy-duty Grade 1 quality hardware; locksets and latch set fully mortised type and lever handles of solid material.

.8 Hardware shall not penetrate the floor.

.9 Provide hardware to suit the purpose of each door. Submit the hardware schedule.

.10 Coordinate with City standard keying requirements as found in Appendix 18D City Standards.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer's recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

END OF SECTION

GLASS AND GLAZING

1. GENERAL

1.1 Summary

.1 This Section specifies glass and glazing.

1.2 Standards

.1 American Society for Testing and Materials (ASTM):

.1 ASTM E330, Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.

.2 Canadian General Standards Board (CGSB):

.1 CAN/CGSB-12.1, Glass, Safety, Tempered or Laminated.

.2 CAN/CGSB-12.3, Glass, Polished Plate or Float, Flat, Clear.

.3 CAN/CGSB-12.8, Insulating Glass Units.

.4 CAN/CGSB-12.9, Glass, Spandrel.

.5 CAN/CGSB-12.11, Glass, Wired, Safety.

.3 Glass Association of North America (GANA) Glazing Manual.

.4 GANA Laminated Glazing Reference Manual.

1.3 Submittals

.1 Submit product data in accordance with Sections 01300, 08000 and the following:

.1 Submit Manufacturer's instructions, printed product literature and data sheets for glass, sealants, and glazing accessories and include product characteristics, performance criteria, physical size, finish and limitations including the following:

.1 Exterior lite, coatings.

.2 Air space.

.3 Interior lite, coatings.

.4 Transmittance:

.1 Visible.

.2 Solar.

.3 UV.

.5 Reflectance:

.1 Visible out.

.2 Visible in.

.3 Solar.

.6 U-value.

.7 Shading coefficient.

.8 Solar heat gain coefficient.

2. PRODUCTS

2.1 Performance Criteria

.1 Glass and glazing:

.1 Exterior and/or interior glass and glazing may be provided as integral components of the exterior envelope, interior partitions and screens, exterior and interior doors.

.2 Except where wired glass is required, interior windows and sidelights shall be tempered glass.

.3 Use laminated safety glass in entry doors and sidelights.

.4 Provide sealed double-glazed or triple-glazing in all exterior glazing applications, including a double low-e coating and argon filled with a light transmittance not less than 55 percent.

.5 Exterior windows will be energy efficient type installed in thermally broken aluminum frames.

.6 Glazing assemblies will have an effective U value of 2.2 and solar heat gain coefficient (SHGC) of around 0.25.

.7 Tinted glass to be used to reduce heat gain and glare where required. Mirrored finishes are not permitted.

.8 Provide insulating glass units with warm air edge spacers in all exterior glazing applications.

.2 Mirrors:

.1 For full wall unframed mirrors, use 6 mm thick minimum float glass backed with electrolytically applied copper plating. Grind smooth and polish all edges.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer's recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

.3 Perform work in accordance with GANA Glazing Manual, GANA Laminating Glazing Reference Manual for glazing installation methods.

END OF SECTION