# 1. GENERAL

## 1.1 WORK INCLUDED

.1 The provisions of all material, labour and supervision for the structural design, detail engineering, factory fabrication, installation and final inspection of the tubular shell frame in accordance with the project drawings and specification

## 1.2 RELATED REQUIREMENTS

.1 Section 03 30 00 – Cast-in-Place Concrete
.2 Section 05 12 23 – Structural Steel for Buildings
.3 Section 05 31 00 – Steel Decking
.4 Section 08 44 23 – Structural Sealant Glazed Curtain Walls

## 1.3 SUBMITTALS

.1 All submittals will be in accordance with Section 01 33 00 – Submittal Procedures, including shop drawings, structural calculations and product data.
.2 Shop drawings and structural calculations will bear the signature and stamp of a professional engineer registered in the Province of Manitoba.
.3 Shop drawings shall be submitted for review prior to fabrication which clearly indicate anchoring details, working points, connections, material sizes, specifications and finishes.
.4 Submit samples of finish as required for Contract Administrator’s selection and approval prior to factory application.
.5 Upon request, provide test reports on structural connections, tube materials and high strength threaded hardware.
.6 Co-ordinate submittal requirements and provide submittals required by Section 01 35 20 – LEED Sustainable Requirements.

## 1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
.2 All components will be wrapped and packaged in factory crating designed to protect the space frame finish during storage and handling procedures.
.3 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
.4 Materials will be delivered to the site in a timely manner to insure uninterrupted progress of the work.
.5 Storage and Handling Requirements:
  .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  .2 Store and protect from nicks, scratches, and blemishes.
  .3 Replace defective or damaged materials with new.

## 1.5 QUALITY ASSURANCE

.1 Qualifications:
  .1 Manufacturer:
    .1 The space frame will be manufactured by a firm having a minimum of ten years of experience in the design, fabrication and construction of space frame structures of similar nature and complexity.
    .2 The manufacturer will certify that all materials have been tested and approved as satisfactory in accordance with their intended use and these contract documents.
  .2 Installer:

.1 The space frame installer will be trained by the manufacturer and all installation work will be under the direct supervision of the manufacturer's duly qualified site representative.

.2 Design Criteria:

.1 The space frame structure will be designed in accordance with the provisions of the specified building code(s) having jurisdiction over the project site. All shop drawings will bear the stamp of a professional engineer registered in the Province of Manitoba.

.2 The structure will be capable of withstanding all forces as required by the National Building Code (2010) and as indicated on the contract drawings.

.1 Dead Loads: Structure Weight plus superimposed dead loads as applicable:

.1 Steel Deck/Roofing System.

.2 Mechanical/Electrical Attachments.

.2 Snow Load: Ground snow load (plus all drift loads as required by the Building Code or as indicated on the contract drawings).

.3 Wind Load: Basic wind speed.

**1.6 WARRANTY**

.1 The manufacturer will issue a written guarantee to the City that all work associated with the fabrication and installation of the space frame structure shall be free of defects in materials and workmanship for a period of one year from the date of inspection and acceptance of the work. Further, that any defects that may arise during this period will be repaired or replaced at no cost to the City.

**2. PRODUCTS**

**2.1 MANUFACTURERS**

.1 The frame structure as specified herein is based on the round steel tube and Triodetic hub connector system as manufactured by:
TRIODETIC LTD.
10 Didak Drive, Arnprior, ON, Canada K7S 0C3
613-623-3434
info@triodetic.com

.2 Substitutions may be considered under the provisions of Section 01 25 00 – Substitution Procedures. The substitute product must be proven to be equivalent to the specified system by submitting drawings, details, samples and structural design data and calculations for Contract Administrator's review and evaluation prior to bid.

.3 Acceptable Manufacturers:

.1 Triodetic Canada,10 Didak Drive, Arnprior Ontario Canada K7S 0C3.

.2 Canam Group Inc., 11535 1re Avenue Bureau 500, Saint-Georges QC Canada G5Y 7H5.

.3 Pre-approved equivalent. Request for equivalency must be completed minimum 7 working days prior to bid closure, and is at the full discretion of the Contract Administrator.

**2.2 MATERIAL**

.1 Round tubes formed to suit the Triodetic connectors: Steel ASTM A500 Grade B or C.

.2 Triodetic connectors and connector plugs: Aluminum alloy AA 6351-T6.

.3 Miscellaneous structural tube sections (purlins): Steel ASTM A500 Grade B.

.4 Connector washers and all miscellaneous structural sections, brackets weldments and connection plates: Steel ASTM A36.

.5 Threaded hardware: Steel ASTM A307, A325, A490 or A193-B7as required by design.

**2.3 FABRICATION**

.1 Structural elements will be factory prefabricated round tubular sections with cold-formed tooth ends to suit the mechanical connector. Tubular members will be accurately controlled in the forming operation to maintain precise length and angles in accordance with the required geometry.

.2 Mechanical connector nodes will be cylindrical aluminum extrusions, factory milled to the required length to accommodate the full length of the formed tubular members.

.3 All miscellaneous ancillary components as required by the contract documents will be accurately custom fabricated to insure compatibility with other related elements of the work.

**2.4 SHOP PAINTING**

**.1 Clean, prepare surfaces and shop prime structural steel in accordance with CAN/CSA-S16 except where members to be encased in concrete.**

**.2 Clean members, remove loose mill scale, rust, oil, dirt and foreign matter. Prepare surface according to NACE No.3/SSPC-SP-6**

**.3 Apply one coat of primer in shop to steel surfaces to achieve minimum dry film thickness in accordance with manufacturer's written recommendations, except:**

**.1 Surfaces to be encased in concrete.**

**.2 Surfaces to receive field installed stud shear connections.**

**.3 Surfaces and edges to be field welded.**

**.4 Faying surfaces of slip-critical connections.**

**.5 Below grade surfaces in contact with soil.**

**.4 Apply paint under cover, on dry surfaces when surface and air temperatures are above 5 degrees Celsius.**

**.5 Maintain dry condition and 5 degrees C minimum temperature until paint is thoroughly dry.**

**.6 Strip paint from bolts, nuts, sharp edges and corners before prime coat is dry.**

**3. EXECUTION**

**3.1 EXAMINATION**

.1 Verification of Conditions: verify that conditions of substrates and surfaces to receive work previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's instructions prior to installation.

.2 Inform Contract Administrator of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval from Contract Administrator.

**3.2 ERECTION**

.1 The installation work will be undertaken by an authorized erector who has been fully trained by the manufacturer.

.2 Assemble and erect the frame structure in accordance with the manufacturer's instructions and in accordance with the shop and assembly drawings.

.3 Apply a clear lubricant at the interface between the formed tooth ends of the structural tube components and the connector node in accordance with the manufacturer's recommendations.

.4 Use only special rawhide-faced mallets as provided by the manufacturer for assembly of the tube components. Metal hammers are not permitted.

.5 Install all component assemblies true to line and plumb. Inspect all attachment components for interface with other sections of the work to insure compliance with the required alignment and dimensions as noted in the shop drawings.

.6 Repair any scratches or damages to the finished surface. On painted applications, touch up all exposed threaded hardware with air-dry material to match the factory finish.

.7 Perform a thorough final inspection of the completed frame installation by authorized manufacturer's personnel, and certify in writing that all work has been satisfactorily completed in accordance with the contract documents.

**3.3 FIELD QUALITY CONTROL**

.1 All assembly and installation work will be conducted under the direct supervision of the manufacturer's qualified site representative.

**3.4 FIELD PAINTING**

**.1 Paint in accordance with Section 09 91 00 – Painting.**

**.1 Touch up damaged surfaces and surfaces without shop coat with primer to NACE No.3/SSPC-SP-6 except as specified otherwise. Apply in accordance: MPI Architectural Painting Specification Manual.**

**3.5 CLEANING**

.1 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

**3.6 PROTECTION**

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

.2 Repair damage to adjacent materials caused by installation.

.3 Contractor shall provide all protective measures necessary to prevent dirt and damage from the work of other trades on or around the finished space frame structure.

**END OF SECTION.**