Part 1 General

1.1 REFERENCES

.1 National Building Code of Canada 2010.

.2 ASTM International, (ASTM)

.1 ASTM A 36/A36M-08, Specification for Structural Steel.

.2 ASTM A 307-10, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.

.3 ASTM A 325-10, Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

.3 Canadian Standards Association (CSA International)

.1 CAN/CSA G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CAN/CSA-G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 CAN/CSA-S16-09, Limit States Design of Steel Structures.

.4 CSA W59-13, Welded Steel Construction (Metal Arc Welding).

.5 CSA W47.1-03, Certification of Companies for Fusion Welding of Steel Structures.

.6 CSA W55.3-08 (R2013), Certification of Companies for Resistance Welding of Steel and Aluminum

.4 The Society for Protective Coatings (SSPC)

.1 SSPC SP-3-00, Power Tool Cleaning.

.2 SSPC SP-6-00, Commercial Blast Cleaning.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop Drawings:

.1 Provide drawings stamped and signed by professional engineer registered or licensed in Province of Manitoba, Canada.

.3 Erection drawings:

.1 Submit erection drawings indicating details and information necessary for assembly and erection purposes including:

.1 Description of methods.

.2 Sequence of erection.

.3 Type of equipment used in erection.

.4 Temporary bracings.

.4 Fabrication drawings:

.1 Submit fabrication drawings showing designed assemblies, components and connections are stamped and signed by qualified professional engineer licensed in the Province of Manitoba, Canada.

.5 Fabricator Reports:

.1 Provide structural steel fabricator's affidavit stating that materials and products used in fabrication conform to applicable material and products standards specified and indicated.

.6 Quality Control Reports:

.1 Submit 4 copies of inspection reports, outlining progress of work and stating whether or not it conforms to the Contract Documents.

1.3 QUALITY ASSURANCE

.1 If requested, submit certified copies of mill reports showing chemical and physical properties of steel used in this Work.

.2 Work of this Section shall be done by a structural steel fabricator/erector who is fully accredited and a current member in good standing of Canada Institute of Steel Construction, or who has submitted a list of experience reference acceptable to the Contract Administrator at least one week prior to tender closing. Failure to meet this requirement may result in disqualification of fabricator/erector.

.3 Welding shall be done by a fabricator fully certified to the conditions of CSA Qualification Code W55.3 or W47.1 respectively. Conform to CAN/CSA-S16 where requirements are at variance.

.4 Advise The Contract Administrator of proposed fabrication schedule, at least ten working days prior to starting, to permit the Testing Agency to arrange for inspection of Work in the shop.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver materials in manufacturer's original, undamaged containers with identification labels intact.

Part 2 Products

2.1 DESIGN REQUIREMENTS

.1 Design details and connections to requirements of CAN/CSA-S16 to resist forces, moments and shears indicated.

.1 Where forces not indicated:

.1 Unless beam supports concentrated loads, design beam connections to support reactions from maximum uniformly distributed load that can be

safely supported by beam in bending.

.2 Where beam supports concentrated loads, request design reactions from The Contract Administrator.

.2 Design connections in line with brace frames to resist lateral forces (tension and compression) indicated on the drawings.

.3 Bolts shall be bearing type, except for connections of members noted as carrying reversing axial load. For connection of members carrying reversing axial load, bolts in shear shall be slip critical, assuming a load factor of 1.5 for determining service loads.

.4 Design brace frame connections in Code specified locations of seismic activity to requirements of CAN/CSA-S16, Clause 27.

.5 Design moment frame connections in Code specified locations of seismic activity to requirements of CAN/CSA-S16-09, Clause 27.2.5.1.

2.2 MATERIALS

.1 Structural steel: to CAN/CSA-G40.21, Type 350W.

.1 Provide product that is classified as a Regionally Manufactured Material, as defined in Section 01 35 21.

.2 HSS Sections: to ASTM A500 Grade C.

.1 Provide product that is classified as a Regionally Manufactured Material, as defined in Section 01 35 21.

.3 Anchor rods: to CSA G40.20/G40.21 -300W

.4 Bolts, nuts and washers: to ASTM A325M. Bolts shall be bearing type, unless otherwise noted.

.5 Welding materials: to CSA W59

.6 Shop paint primer: to CAN/CGSB-1.40 or CAN/CGSB-1.181.

.7 Shop galvanizing: hot dip galvanizing to CAN/CSA-G164, minimum zinc coating of 600 g/m2**. All exterior structural steel to be hot dipped galvanized.**

.8 Shear studs: to CSA W59, Appendix H.

.1 Provide product that is classified as a Regionally Manufactured Material, as defined in Section 01 35 21.

.9 Touch-up Paint and primer: Maximum VOC: 150 g/L (less water)

2.3 FABRICATION

.1 Fabricate structural steel in accordance with CAN/CSA-S16 and in accordance with approved shop drawings. Mark and match-mark units for field assembly.

.2 Connections shall be as shown on final shop drawings. In general, use welded connections for shop work, and high strength bolts for all field connections, except as otherwise indicated. Furnish templates for bolt installation by others.

.3 Provide anchor bolts, bearing assemblies, inserts, wall plates and other hardware (including setting templates) for structural steel beam, joist and deck connections to cast-

in-place concrete or masonry, for installation under the Work of Divisions 03 or 04.

.4 Fabricate structural steel members to provide holes for securing other work and for passage of other work through steel framing. Reinforce openings to maintain required design strength. No openings shall be made without written approval of the Contract Administrator.

.5 Weld adjustable masonry anchors to structural steel, as directed by mason.

.6 Shop weld, to structural steel, anchorage devices for tie-back and lifeline anchors, davit bases, or other window-washing anchor devices, in accordance with manufacturer's instructions and reviewed shop drawings.

.7 Continuously seal members by continuous welds where indicated. Grind smooth where indicated in exposed work.

.8 Supply and install end-welded shear studs in accordance with CSA W59.

.9 Provide cambers to beams and/or purlins, as shown on the Drawings.

2.4 SHOP PAINTING

.1 Clean, prepare surfaces and shop prime structural steel to CAN3-S16.

.2 Interior Steel

.1 Surface preparation: conform to SSPC SP-6.

.2 Primer: one coat oil alkyd type to CGSB 1-GP-40.

.3 Dry film thickness: 0.0381 mm minimum.

.3 Exterior Exposed Steel, Galvanized:

.1 Clean, prepare and galvanize to CSA G164 (610g/m2, hot dipped).

.4 Exterior Exposed Steel: Non-Galvanized:

.1 Surface preparation: to SSPC SP-6, commercial blast cleaning using mechanical shot blast techniques. Hand cleaning not permitted.

.2 Primer: One coat zinc rich type: to CAN/CGSB-1.181, minimum 0.0508 mm/maximum 0.0762 mm dry thickness.

.3 Primer to be compatible with finish paint.

.5 Do not paint:

.1 Surfaces and edges to be field welded, or to have field installed stud shear connectors,

.2 Surfaces that are in contact at bolted friction type connections or

.3 Surfaces that are in contact with concrete or mortar.

Part 3 Execution

3.1 GENERAL

.1 Erect structural steel as indicated in accordance with CAN/CSA-S16, CAN-S136, and in accordance with reviewed shop drawings.

.2 Welding: in accordance with CSA W59.

.3 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel structures and/or CSA W55.3 for resistance welding of structural components.

3.2 MARKING

.1 Mark materials in accordance with CAN/CSA G40.20/G40.21. Do not use die stamping. If steel is to be left in unpainted condition, place marking at locations not visible from exterior after erection.

.2 Match marking: shop mark bearing assemblies and splices for fit and match.

3.3 CONNECTION TO EXISTING WORK

.1 Verify dimensions and condition of existing work, report discrepancies and potential problem areas to The Contract Administrator.

3.4 ERECTION

.1 Erect structural steel as indicated in accordance with CAN/CSA-S16, CAN-S136, and in accordance with reviewed shop drawings.

.2 Provide necessary erection equipment, bracing, shoring and temporary flooring as required for erection and for all safety regulations. Brace and support structure during erection to ensure that it is maintained in alignment under construction and other loading and until all other construction elements contributing to stability are in place.

.3 Check anchor bolt and insert layout before erection. Arrange for correction of discrepancies.

.4 Set base plates on cleaned bearing surfaces. Solidly pack open spaces between shims with bedding mortar consisting of non-shrink grout as specified in Section 03 30 00.

.5 Obtain permission of The Contract Administrator prior to field cutting or altering of structural members not shown on Drawings.

.6 Clean field welds, bolted connections and abraded areas. Apply touch up shop primer (or zinc rich paint for galvanized steel) to bolts, welds and burned or scratched surfaces at completion of erection.

.7 Continuously seal members by continuous welds where indicated. Grind smooth.

3.5 FIELD QUALITY CONTROL

.1 Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by The Contract Administrator.

.2 The Inspection and Testing Company will carry out vertical and horizontal alignment checks, torque testing and inspection of bolted and welded connections for a minimum 10% representative sample of connections. Welding inspections to be visual, except where non-destructive testing is deemed necessary by the Testing Agency or The Contract Administrator.

.3 Provide safe access and working areas for testing on site, as required by testing agency and as authorized by The Contract Administrator.

.4 Test shear studs in accordance with CSA W59.

3.6 DEFECTIVE WORK

.1 Remove and replace, or repair, damaged or defective work, at no cost to the Contract Administrator.

.2 Contractor shall be responsible for the cost of additional testing and re-inspection made necessary by the occurrence of deficient Work.

.3 Submit in writing details of proposed method of remedial work, for approval by the Contract Administrator. Details to be signed and sealed by a licensed Professional Engineer retained by the Contractor.

.4 Correction of misaligned holes or other field modifications by flame-cutting is not permissible.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 05 31 00 - Steel Deck

.2 Section 05 12 23 – Structural Steel for Buildings

.3 Section 09 91 99 – Painting for Minor Works

.4 General Notes on Structural Drawings shall form part and be equal to the specifications.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB) (latest)

.1 CAN/CGSB-85.10, Protective Coatings for Metals

.2 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA)

.1 CISC/CPMA 1, Quick-Drying, One-Coat Paint for Use on Structural Steel

.3 Canadian Standards Association (CSA International)

.1 CSA-G40.20/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel

.2 CAN/CSA-S16-09, Limit States Design of Steel Structures

.3 CSA-S136-07, Cold Formed Steel Structural Members

.4 CSA-W47.1-09, Certification of Companies for Fusion Welding of Steel Structures

.5 CSA-W55.3-08, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings

.6 CSA-W59-03, Welded Steel Construction (Metal Arc Welding) Metric

1.3 QUALITY ASSURANCE

.1 Upon request submit two copies of mill test reports at least four weeks prior to fabrication of steel joists and accessories. Reports to show:

.1 Chemical and physical properties.

.2 Other details of steel to be incorporated into work.

.3 Certification by qualified metallurgists confirming that tests conform to requirements of CSA G40.20/G40.21

.2 Supply affidavit prepared by fabricator of structural steel joists stating that materials and products used in fabrication conform to this specification.

1.4 DESIGN OF STEEL JOISTS AND BRIDGING

.1 Design steel joists and bridging to carry loads indicated in joist schedule shown on drawings and in accordance with CAN/CSA-S16, unless otherwise noted on drawings.

.2 Design joists and anchorages for uplift forces as indicated.

.3 Ensure joists are manufactured to consider load effects due to fabrication, erection and handling.

.4 Limit roof/floor joist deflection due to specified live load to L/360 of span for floors and L/240 for roofs.

.5 Joists shall be cambered for the greater of full dead load deflection or for nominal camber as specified in CSA S16.

.6 Connection of tie-joists to column capable to resist 25 kN tension or compression force parallel with the joists chords.

.7 Provide top and bottom chord bridging with cross-bridging in-between joists and end bays as per CAN/CSA S16.

1.5 SHOP DRAWINGS

.1 Submit shop details and erection drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit drawings stamped and signed by qualified professional engineer licensed in province of Manitoba, Canada.

.3 Indicate on erection drawings, relevant details such as joist mark, depth, spacing, bridging lines, bearing, anchorage and details.

.4 Provide particulars, on shop drawings, relative to joist geometry, framed openings, splicing details, bearing and anchorage. Include member size, properties, specified and factored member loads, and stresses under various loadings, deflection and camber.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Do not dispose of unused paint material into sewer system, into streams, lakes, onto ground or in other locations where it will pose health or environmental hazard.

Part 2 Products

2.1 MATERIALS

.1 Open web steel joists to have minimum flat width to top chord surface no less than 38mm.

.2 Structural steel: to CSA-G40.20/G40.21 and CSA-S136.

.3 Welding materials: to CSA-W59 with CSA-W59S1.

.4 Shop paint primer: to CISC/CPMA-1.

2.2 FABRICATION

.1 Fabricate steel joists and accessories as indicated in accordance with CAN/CSA-S16 and in accordance with reviewed shop drawings.

.2 Weld in accordance with CSA-W59 and with CSA-W59S1.

.3 Provide top and bottom chord extensions where indicated.

.4 Provide diagonal and horizontal bridging and anchorages as indicated.

Part 3 Execution

3.1 GENERAL

.1 Structural steel work: in accordance with CAN/CSA-S16.

.2 Welding: in accordance with CSA-W59 and with CSA-W59S1.

.3 Companies to be certified under Division 1 or 2.1 of CSA-W47.1 for fusion welding and/or CSA-W55.3 for resistance welding.

.4 Provide certification that welded joints are qualified by Canadian Welding Bureau.

3.2 ERECTION

.1 Erect steel joists and bridging as indicated in accordance with CAN/CSA-S16 and in accordance with reviewed erection drawings.

.2 Complete installation of all bridging and anchorages before placing construction loads on joists.

.3 Field cutting or altering joists or bridging that are not shown on shop drawings: to approval of Contract Administrator.

.4 Clean and touch up shop primer to bolts, welds, burned or scratched surfaces at completion of erection.

3.3 SHOP PAINTING

.1 Clean, prepare and shop prime surfaces of steel joists to CAN/CSA-S16.

.2 Clean members of loose mill scale, rust, oil, dirt and other foreign matter. Prepare surfaces in accordance with SSPC SP1 brush blast.

.3 Apply one coat of CISC/CPMA 1 primer to steel surfaces to achieve maximum dry film thickness of 0.65 mm to 0.80 mm except:

- .1 Surfaces to be encased in concrete.
- .2 Surfaces and edges to be field welded.

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

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

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

3.4 FIELD PAINTING

.1 Touch up all damaged surfaces and surfaces without shop coat with CISC/CPMA-1 in accordance with manufacturer's recommendations to CAN/CGSB-85.10.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International, (ASTM)

.1 ASTM A 653/A653M-10, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.

.3 Canadian Standards Association (CSA International)

.1 CSA-S136-07, North American Specification for the Design of Cold Formed Steel Structural Members.

.2 CSA W47.1-03, Certification of Companies for Fusion Welding of Steel.

.3 CSA W55.3-1965(R2003), Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.

.4 CSA W59-03, Welded Steel Construction, (Metal Arc Welding).

.4 Canadian Sheet Steel Building Institute (CSSBI)

.1 CSSBI 10M-08, Standard for Steel Roof Deck.

.2 CSSBI 12M-08, Standard for Composite Steel Deck.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit shop drawings erection and shoring drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit drawings stamped and signed by qualified Professional Engineer registered and licensed in the Province of Manitoba.

.3 Submit design calculations if requested by The Consultant.

.4 Indicate deck plan, profile, dimensions, base steel thickness, metallic coating designation, connections to supports and spacings, projections, openings, reinforcement details and accessories. Show welding and connection details for diaphragm action.

.5 Indicate details of temporary shoring of steel deck, such as location, time and duration of placement and removal of shoring for concrete fill decks.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials for disposal to recycling facilities.

1.4 QUALITY ASSURANCE

.1 Steel deck manufacturers: members in good standing of the Canadian Sheet Steel Building Institute.

Part 2 Products

2.1 DESIGN REQUIREMENTS

.1 Design steel deck using limit states design in accordance with CSA S136, CSSBI 10M and CSSBI 12M.

.2 Steel decking and all connectors/fasteners shall be designed to safely carry dead, live and diaphragm loads as indicated, including any variable or concentrated loads, wind uplift and construction loads.

.3 Deflection under live loads (including construction loads) shall not exceed:

.1 Roof Deck: 1/240th of span, except when plaster or gypsum board ceilings are suspended directly from deck, live load deflection not to exceed 1/360th of span.

2.2 MATERIALS

.1 For interior surfaces not exposed to weather:

.1 Zinc-Iron Alloy (ZF) coated steel sheet: to ASTM A653/A653M, structural quality, Grade 230, 0.76 mm minimum base steel thickness.

.1 For unpainted decks: with ZF75 zinc coating suitable for unpainted finish, and chemically treated (passivated).

.2 For painted decks: with ZF75 wiped coat zinc-iron alloy coating suitable for finish painting (not passivated).

.3 Provide product that is classified as a Regionally Manufactured Material.

.2 For exterior surfaces exposed to weather:

.1 Zinc (Z) coated steel sheet to ASTM A 653/A653M structural quality Grade 230, with Z275 coating, regular spangle extra smooth surface, chemically treated for unpainted finish, not chemically treated for paint finish, 0.76 mm minimum base steel thickness.

.2 Provide product that is classified as a Regionally Manufactured Material.

.3 Acoustic insulation: fibrous glass 17.5 kg/m³ density profiled to suit deck flutes, where indicated, supplied to site for installation by roofing contractor.

.4 Acoustic closures: closed cell foam rubber, profiled to deck corrugations, 25mm thick.

.5 Perimeter Closures, neoprene.

.6 Cover plates, cell closures and flashings: steel sheet with minimum base steel thickness 0.76 mm. Metallic coating same as deck material.

.7 Touch-up Primer: zinc rich, ready mix to CAN/CGSB-1.181, zinc rich type.

.1 Maximum VOC Content: 250 g/L (less water).

.8 Shear studs: to CSA W59.

.1 Provide product that is classified as a Regionally Manufactured Material.

2.3 TYPES OF DECKING

.1 Steel roof deck: steel thickness and deck depth as indicated on the drawings, non-cellular, interlocking side laps.

.2 Acoustic steel deck where indicated: steel thickness and deck depth as indicated on the drawings, non-cellular, perforated on vertical face of flutes, interlocking side laps.

.3 Composite steel deck where indicated: steel thickness and deck depth as indicated on the drawings, non-cellular upright inverted embossed fluted profile, and interlocking side laps.

Part 3 Execution

3.1 GENERAL

.1 Structural steel work: in accordance with CAN/CSA-S136, and CSSBI 10M and CSSBI 12M.

.2 Welding: in accordance with CSA W59, except where specified otherwise.

.3 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel and/or CSA W55.3 for resistance welding.

3.2 ERECTION

.1 Erect steel deck as indicated and in accordance with CSA S136, CSSBI 10M, CSSBI 12M and reviewed shop drawings.

.2 Tolerances: lay and position deck within a tolerance of 10mm with respect to edges of deck parallel to flutes and centerlines of supporting structure.

.3 Provide anchor plates where deck bears on masonry and/or concrete.

.4 Lap ends: 50 mm minimum unless noted.

.5 Roof deck connections:

- .1 To supporting steel beams or joists: 20mm plug welds, 36/4 fastener pattern
- .2 At deck sidelaps: mechanically clinch @ 300 o/c
- .3 At perimeter of building: 19mm plug welds at 300 o/c

.6 Weld and test shear stud connectors through steel deck to steel beams, joists or wall plates below as indicated on the drawings, or as required under the Work of other Sections.

.7 Immediately after decking is permanently secured in place, touch up surface with compatible primer where burned by welding, or otherwise damaged.

.8 Reinforce openings to CSSBI Standards, or as indicated on the drawings.

.9 Provide cover plates, cell closures and flashing, where indicated or required.

.10 No ceiling, lighting, sprinkler pipe, ductwork, electrical conduit or other item shall be hung from steel deck, unless shown on the drawings.

.11 Provide solid blocking between the flutes of the roof deck and supporting members, where additional load due to sleepers or curbs at roof top equipment is placed on the roof deck.

.12 Upon completion of erection remove dirt and debris from deck.

.13 Provide metal flashing to form edges of slab and trimmers around openings, where steel angles not provided under the Work of Section 05 12 23.

.14 Prior to concrete placement, steel deck to be free of soil, debris, standing water, loose mil scale and other foreign matter.

.15 Temporary shoring, if required, to be designed to support construction loads, wet concrete and other construction equipment. Do not remove temporary shoring until concrete attains 75% of its specified 28 day compression strength.

.16 Place and support reinforcing steel as indicated.

3.3 OPENINGS AND AREAS OF CONCENTRATED LOADS

.1 No reinforcement required for openings cut in deck which are smaller than 150 mm square.

.2 Frame deck openings with any one dimension between 150 and 450 mm as recommended by manufacturer, except as otherwise indicated.

.3 For deck openings with any one dimension greater than 450 mm and for areas of concentrated load, reinforce in accordance with structural framing details.

3.4 CONNECTIONS

.1 Provide connections in accordance with CSSBI recommendations as indicated.

3.5 DEFECTIVE WORK

.1 Remove and replace, or repair, damaged or defective work, at no cost to the Contract.

.2 Submit in writing, details of proposed method of remedial work, for approval by the Contract Administrator. Details to be signed and sealed by a licensed Professional Engineer retained by the Contractor.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Shop fabricated ferrous metal items.

.2 Shop fabricated aluminum items.

.3 Steel pipe handrails balusters, and fitting.

.4 Stainless steel canopy framing

1.2 RELATED SECTIONS

.1 Sructural Specifications.

.2 Section 01 61 00 – Common Product Requirements.

.3 Section 04 05 00 – Common Work Results for Masonry.

.4 Section 06 10 13 - Wood Blocking and Curbing.

.5 Section 06 20 00 – Finish Carpentry

.6 Section 09 91 99 – Painting for Minor Works.

.7 Section 09 97 19 – Paint of Exterior Metal Surfaces

.8 Section 10 14 00 – Building Signage

1.3 REFERENCES

.1 ASTM A53/A53M-07 - Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.

.2 ASTM A153/A153-09 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

.3 ASTM A307-07b - Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.4 ASTM A500/A500M-09 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

.5 ASTM A501-07 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

.6 ASTM B177- 01(2006)e1 - Engineering Chromium Electroplating.

.7 ASTM B209M-07 - Aluminum and Aluminum-Alloy Sheet and Plate.

.8 ASTM B210M-05 - Aluminum and Aluminum-Alloy Drawn Seamless Tubes.

.9 ASTM B211M-03 - Aluminum and Aluminum-Alloy Bar, Rod, and Wire.

.10 ASTM B221M-07 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

.11 CAN/CGSB-1.40-97 - Anti-corrosive Structural Steel Alkyd Primer.

.12 CAN/CGSB-1.181-99 - Ready-Mixed, Organic Zinc-Rich Coating.

.13 CAN/CSA-G40.20-04/G40.21-04 (R2009) - General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.14 CSA S16-09 - Design of steel structures.

.15 CSA-W47.1-09 - Certification of Companies for Fusion Welding of Steel Structures.

.16 CSA-W47.2-M1987 (R2009) - Certification of Companies for Fusion Welding of Aluminum.

.17 CSA-W48-06 - Filler Metals and Allied Materials for Metal Arc Welding

.18 CSA-W55.3-08 - Certification of Companies for Resistance Welding of Steel and Aluminum.

.19 CSA-W59-03 (R2008) - Welded Steel Construction (Metal Arc Welding).

.20 CSA-W59.2-1991(R2008) - Welded Aluminum Construction.

.21 SSPC (The Society for Protective Coatings) - Steel Structures Painting Manual.

1.4 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Submission procedures.

.2 Shop Drawings:

.1 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.5 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Submission procedures.

1.6 CLOSEOUT SUBMITTALS

.1 Section 01 78 00: Closeout Submittals.

1.7 QUALITY ASSURANCE

.1 Welders' Certificates: Submit to Section 01 33 00 requirements, certifying welders employed on the Work, verifying qualification within the previous twelve (12) months to CSA-W47.1 (steel), CSA-W47.2 (aluminum).

.2 Welded Steel Construction: CSA-W59.

.3 Welded Aluminum Construction: CSA-W59.2.

.4 Design of steel structures: CSA S16.

.5 Prepare Shop Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the place where the Project is located.

.6 Comply with requirements of the Building Code in place of work, and local authority having jurisdiction. It is the responsibility of this subcontractor to design and fabricate handrails in accordance with barrier free requirements.

Part 2 Products

2.1 MATERIALS - STEEL

.1 Steel Sections and Plates: CAN/CSA-G40.20/G40.21, Grade 300W. 350W for wide flange and HSS Sections.

.2 Steel Pipe: ASTM A53/A53M, Standard weight, galvanized finish

.3 Stainless steel: to ASTM A269, Type 304 Commercial grade seamless welded with AISI No. 4 finish.

.4 Bolts, Nuts, and Washers: ASTM A307.

.5 Wire: cold drawn steel.

.6 Sheet steel: to ASTM A526, commercial quality, thicknesses indicated, ZF075 zinc coating to ASTM A525 M.

.7 Exposed fastenings: same material, colour, finish as fastened metal, as indicated.

.8 Isolation coating: to CGSB 1 GP 108c, alkali resistant, bituminous paint.

.9 Welding Materials: Type required for materials being welded.

.10 Welding Filler Material: CSA-W48.

.11 Shop and Touch-Up Primer: CAN/CGSB-1.40, colour grey.

.12 Galvanizing: to CSA G164 M92, hot dipped galvanizing, minimum zinc coating 600g/m^2 (2 oz/sq.ft).

.13 Aluminum extrusion: Aluminum Association Alloy AA 6063 T6.

.14 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

2.2 FABRICATION

.1 Fit and shop assemble items in largest practical sections, for delivery to Site.

.2 Fabricate items with joints tightly fitted and secured.

.3 Continuously seal joined members by continuous welds.

.4 Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

.5 Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

.6 Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

.7 Use self-tapping shake-proof screws on items required to be assembled by screws or as indicated. Use screws for interior metal work, except where noted otherwise. Use welded connections for exterior metal work, unless otherwise approved by Contract Administrator.

.8 Where possible, work to be fitted and shop assembled, ready for erection.

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

.10 All exposed fastenings shall be of the same material, colour, and finish as the metal to which applied unless specifically shown or listed otherwise.

.11 All items supplied by this section shall be complete with all fastenings.

.12 Drill for countersunk screws and anchor bolts. Prime paint.

.13 Galvanize all exterior work except for materials scheduled for painting.

.14 All metal fabrications accessible to the public shall have burrs, sharp filings, or dangerous protrusions removed and ground smooth. Contractor shall correct any dangerous installation as direct by the Contract Administrator.

.15 Site confirm field dimensions prior to fabrication.

2.3 FABRICATION TOLERANCES

.1 Squareness: 3 mm (1/8 inch) maximum difference in diagonal measurements.

.2 Maximum Offset Between Faces: 1.6 mm (1/16 inch).

.3 Maximum Misalignment of Adjacent Members: 1.6 mm (1/16 inch).

.4 Maximum Bow: 3 mm in 1.2 m (1/8 inch in 4 ft).

.5 Maximum Deviation From Plane: 1.6 mm in 1.2 m (1/16 inch in 4 ft).

2.4 FINISHES - STEEL

.1 Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

.2 Do not prime surfaces in direct contact with concrete or where field welding is required.

.3 Prime paint items with two (2) coats.

.4 Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M. Provide minimum 600 g/sq m (2.0 oz/sq ft) galvanized coating.

.5 Non-structural Items: Galvanized after fabrication to ASTM A123/A123M. Provide minimum 380 g/sq m (1.25 oz/sq ft) galvanized coating.

.6 Shop Painting:

.1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items. Apply two coats of primer to areas inaccessible after final installation.

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

.3 Clean surfaces to be field welded. Do not paint.

.4 Non-ferrous metals shall be finished as specified by item.

.7 Refer to Section 09 97 19 for painting of exterior metal surfaces.

2.5 MOCKUPS

.1 Refer to Section 01 45 00.

.2 Exterior Stainless Steel Canopy Framing:

.1 Provide a mock-up showing the typical tube joint splice connection for Contract Administrator's review before commencing with work. Mock up to also include the welded tube end cap. Refer to Drawings for details.

Part 3 Execution

3.1 EXAMINATION

.1 Verify that field conditions are acceptable and are ready to receive work.

.2 Verify dimensions, tolerances, and method of attachment with other work.

3.2 PREPARATION

.1 Clean and strip primed steel items to bare metal where Site welding is required.

.2 Supply steel items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

3.3 INSTALLATION

.1 Install items plumb and level, accurately fitted, free from distortion or defects.

.2 Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

.3 Field weld components indicated on Drawings.

.4 Perform field welding to CSA requirements.

.5 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.

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

.7 Obtain approval prior to Site cutting or making adjustments not scheduled.

.8 After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

3.4 ERECTION TOLERANCES

.1 Section 01 73 00: Tolerances.

.2 Maximum Variation From Plumb: 6 mm (1/4 inch), non-cumulative.

.3 Maximum Offset From True Alignment: 6 mm (1/4 inch).

.4 Maximum Out-of-Position: 6 mm (1/4 inch).

3.5 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 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 metal fabrications installation.

3.7 SCHEDULES

.1 The following Schedule is a list of principal items only. Refer to Drawing details for items not specifically scheduled.

.2 HSS Exterior Fence Posts

.1 Supply HSS posts at spacings indicated on plan. Size of fence posts indicated on Drawings.

.3 Stainless Steel Tube Canopy Framing

.1 Supply 50mm x 50mm x 4.5mm, Type 304 stainless steel tube canopy framing as indicated on Drawings. Refer to Separate Prices for alternate finish.

.4 Exterior Change Room Bench Brackets

.1 Supply bent stainless steel plate brackets to support wood benches in exterior change rooms. Refer to Drawings for details.

.5 Steel Angle Lintels

.1 Supply steel angles for openings in masonry walls, prime painted. Provide minimum 200mm (8 inches) bearing at ends of openings. Refer to Structural Drawings.

.2 Weld or bolt back to back angles to profiles indicated.

.6 Stainless Steel W/C Vanity countertop:

.1 14 ga stainless steel countertop and edge faces fully adhered to 2 layers 19mm plywood

.2 Seamless welded seams ground and finished smooth with AISI No. 4 finish

.3 Support Brackets as indicated on drawings.

.7 Stainless Steel Mirrors

.1 12 gauge (2.5mm) 304 grade Stainless Steel with #8 mirror finish

.2 provide ss channel divider strip with #8 mirror finish

.3 refer to drawings for sizes and locations

.8 Stainless Steel Exterior Building Signage

.1 Supply stainless steel plate materials for Exterior Washroom Signage as noted in Section 10 14 00.

END OF SECTION