Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 05 21 00 – Steel Joist Framing.

.2 Section 05 31 00 – Steel Decking.

.3 Section 05 50 00 – Metal Fabrications.

.4 Section 05 51 29 – Metal Stairs and Ladders.

.5 Section 06 18 00 – Glue-Laminated Construction

1.2 REFERENCES

.1 All references to be the latest edition as of the date indicated on the specifications.

.2 ASTM International Inc.

.1 ASTM A36/A36M, Standard Specification for Carbon Structural Steel.

.2 ASTM A193/A193M, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature or High-Pressure Service and Other Special Purpose Applications.

.3 ASTM A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.4 ASTM A325, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

.5 ASTM A325M, Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength[Metric].

.6 ASTM A490M, Standard Specification for High-Strength Steel Structural Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints [Metric].

.3 Canadian General Standards Board (CGSB)

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

.4 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturers Association (CPMA).

.1 Handbook of the Canadian Institute of Steel Construction.

.2 CISC/CPMA Standard 2-75, Quick-Drying Primer for use on Structural Steel.

.5 Canadian Standards Association (CSA International)

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

.2 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.

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

.4 CAN/CSA-S136, North American Specifications for the Design of Cold Formed Steel Structural Members.

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

.6 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding.

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

.8 CSA W59, Welded Steel Construction (Metal Arc Welding).

.6 Master Painters Institute

.1 MPI-INT 5.1, Structural Steel and Metal Fabrications.

.2 MPI-EXT 5.1, Structural Steel and Metal Fabrications.

.7 The Society for Protective Coatings (SSPC) and National Association of Corrosion Engineers (NACE) International

.1 NACE No. 3/SSPC SP-6, Commercial Blast Cleaning.

1.3 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 stamped and signed by Professional Engineer registered or licensed in Province of Manitoba, Canada 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 Source Quality Control Submittals:

.1 Submit 2 copies of mill test reports 4 weeks prior to fabrication of structural steel.

.1 Mill test reports to show chemical and physical properties and other details of steel to be incorporated in project.

.6 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.

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.

.3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding and packaging materials as specified Section 01 35 20 LEED Sustainable Requirements and 01 74 19 Waste Management and Disposal.

Part 2 Products

2.1 DESIGN REQUIREMENTS

.1 Design details and connections in accordance with requirements of CAN/CSA-S16 and CAN/CSA-S136 [with CSA-S136.1 to resist forces, moments, shears and allow for movements indicated.

.2 Shear connections:

.1 Select framed beam shear connections from an industry accepted publication such as "Handbook of the Canadian Institute of Steel Construction" when connection for shear only (standard connection) is required.

.2 Select or design connections to support reaction from maximum uniformly distributed load that can be safely supported by beam in bending, provided no point loads act on beam, when shears are not indicated.

.3 Glulam to steel connections:

.1 The Glulam to steel connections shall be designed and detailed by the Glulam supplier.

.2 The Glulam connections to be reviewed by the steel supplier to confirm the design is adequate for the steel components. Steel supplier to reinforce steel components in the area of the connection as required to resist the applied forces.

.3 The Glulam connections shall be supplied by the steel supplier.

.4 For composite construction select or design minimum end connection to resist reaction resulting from factored movement resistance as tabulated in the "Handbook of the Canadian Institute of Steel Construction" assuming 100% shear connection with depth of steel deck and/or slab shown on drawings.

.5 Submit sketches and design calculations stamped and signed by qualified Professional Engineer licensed in Province of Manitoba, Canada for non standard connections.

.6 The Glulam to steel to be designed and detailed by the Glulam supplier. Connection to be reviewed by steel supplier to confirm that the connection design is adequate for the steel components. Connections to be supplied by the steel supplier.

2.2 MATERIALS

.1 Structural steel: to CSA-G40.20/G40.21 Grade 350W.

.2 Anchor bolts: to CSA-G40.20/G40.21, Grade 300W, ASTM A36/A36M.

.3 Bolts, nuts and washers: to ASTM A307, ASTM A325/A325M and ASTM A490/A490M.

.4 Welding materials: to CSA W48 Series and CSA W59 and certified by Canadian Welding Bureau.

.5 Shop paint primer: to CISC/CPMA2-75 solvent reducible alkyd, grey.

.6 Hot dip galvanizing: galvanize steel, where indicated, to CAN/CSA-G164, minimum zinc coating of 600 g/m^2.

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

2.3 FABRICATION

.1 Fabricate structural steel in accordance with CAN/CSA-S16 and CAN/CSA-S136 and in accordance with reviewed shop drawings.

.2 Install shear studs in accordance with CSA W59.

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

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 C.

.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.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 GENERAL

.1 Structural steel work: in accordance with CAN/CSA-S16 and CAN/CSA-S136.

.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.

3.3 MARKING

.1 Mark materials in accordance with CSA G40.20/G40.21. Do not use die stamping. When 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.

3.4 ERECTION

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

.2 Field cutting or altering structural members: to approval of Contract Administrator.

.3 Clean with mechanical brush and touch up shop primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection.

.4 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 approved by the Contract Administrator.

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

.3 Submit test reports to Contract Administrator within 2 weeks of completion of inspection.

.4 Pay costs of tests as specified in Section 01 29 83 - Payment Procedures for Testing Laboratory Services.

.5 Test shear studs in accordance with CSA W59.

3.6 FIELD PAINTING

.1 Paint in accordance with Section 09 91 23 - Interior 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.

3.7 CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal and 01 35 20 - LEED Sustainable Requirements.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 05 12 23 – Structural Steel for Buildings.

.2 Section 05 31 00 – Steel Decking.

.3 Section 05 50 00 – Metal Fabrications.

.4 Section 05 51 29 – Metal Stairs and Ladders.

1.2 REFERENCES

.1 All references to be the latest edition as of the date indicated on the specifications.

.2 Canada Green Building Council (CaGBC)

.1 LEED Canada-NC Version 1.0, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations (including Addendum).

.3 Canadian General Standards Board (CGSB)

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

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

.1 CISC/CPMA 2-75, Quick-Drying, Primer for Use on Structural Steel.

.2 CISC/CPMA 1-73a, Quick-Drying, One-Coat Paint for Use on Structural Steel.

.5 CSA International

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

.2 CSA S16, Design of Steel Structures.

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

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

.5 CSA W55.3, Certificate of Companies for Resistance Welding of Steel and Aluminum.

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

.6 The Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for steel joist framing and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by Professional Engineer registered or licensed in the Province of Manitoba, Canada.

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

.3 Indicate 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.

.4 Delegated Design Submittals:

.1 Submit floor vibration analysis as directed by Contract Administrator.

.2 Submit 2 copies of calculations and joist design drawings for typical joists to Contract Administrator for review at least 4 weeks prior to fabrication and/or delivery.

.5 Sustainable Design Submittals:

.1 LEED Canada-NC Version 1.0 Submittals: in accordance with Section 01 35 20 - LEED Sustainable Requirements.

.2 Construction Waste Management:

.1 Submit project Waste Management Plan and Waste Reduction Workplan highlighting recycling and salvage requirements.

.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates in accordance with Section 01 35 20 – LEED Sustainable Requirements.

.3 Recycled Content:

.1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products in accordance with Section 01 35 20 – LEED Sustainable Requirements.

.4 Regional Materials: submit evidence that project incorporates required percentage of regional materials and products in accordance with Section 01 35 20 – LEED Sustainable Requirements.

1.4 QUALITY ASSURANCE

.1 Submit 2 copies of mill test reports at least 4 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 Submit affidavit prepared by fabricator of structural steel joists stating that materials and products used in fabrication conform to this specification.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off the ground, in a dry location and in accordance with manufacturer's written instructions.

.2 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan and Waste Reduction Workplan related to Work of this Section and in accordance with Section 01 35 20 - LEED Sustainable Requirements.

.5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding and packaging materials as specified Section 01 35 20 LEED Sustainable Requirements and 01 74 19 Waste Management and Disposal.

Part 2 Products

2.1 DESIGN CRITERIA

.1 Design steel joists and bridging to carry loads indicated in joist schedule shown on drawings to CSA S16.

.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 joist deflection due to specified live load to 1/360 maximum of span.

.5 Limit floor joist deflection due to specified live load to 1/360 of maximum span.

.6 Open web steel joist web configuration to have a clear opening to allow the passage of a 600 mm diameter duct plus 25mm of insulation for a total clear opening of a minimum of 650mm. Refer to duct layout on mechanical drawings.

.7 Open web steel joist bridging to be configured to allow the passage of an 800 x 600 mm rectangular duct plus 25 mm of insulation for a total clear opening of 850 x 650 mm. Refer to the duct layout on the mechanical drawings.

2.2 MATERIALS

.1 Open web steel joists: to CSA S16.

.2 Structural steel: to CSA G40.20/G40.21.

.3 Welding materials: to CSA W59.

.4 Shop paint primer: to CISC/CPMA-2.

2.3 FABRICATION

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

.2 Weld in accordance with CSA W59.

.3 Provide top and bottom chord extensions where indicated.

.4 Provide diagonal and horizontal bridgings and anchorages as required.

2.4 SHOP PAINTING

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

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

.3 Apply one coat of CISC/CPMA 2 primer to steel surfaces to achieve dry film thickness as recommended by primer manufacturer, except:

.1 Surfaces to be encased in concrete.

.2 Surfaces to receive field installed stud shear connectors and steel decks.

.3 Surfaces and edges to be field welded.

.4 Faying surfaces of friction-type 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 C.

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

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

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for steel joist framing installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Contract Administrator.

.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 to proceed from Contract Administrator.

3.2 INSTALLATION

.1 Do structural steel work: to CSA S16.

.2 Do welding: in accordance with CSA W59.

.3 Ensure installers are certified to CSA W47.1 for fusion welding and CSA W55.3 for resistance welding.

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

3.3 FIELD QUALITY CONTROL

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

.2 Testing laboratory will inspect representative joists for integrity, accuracy of fabrication and soundness of welds. Testing laboratory will also monitor test loading of joists used by manufacturer to verify design and check representative field connections. Contract Administrator will determine extent of and identify all inspections.

.3 Submit test report to Contract Administrator within 5 days after completion of inspection.

.4 Pay costs of tests as specified in Section 01 29 83 - Payment Procedures for Testing Laboratory Services.

3.4 ERECTION

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

.2 Complete installation of 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.

3.5 FIELD PAINTING

.1 Paint: in accordance with Section 09 91 23 - Interior Painting.

.2 Touch up all damaged surfaces and surfaces without shop coat with CISC/CPMA-2 in accordance with manufacturers' recommendations.

3.6 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 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal and 01 35 20 – LEED Sustainable Requirements.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.7 PROTECTION

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

.2 Repair damage to adjacent materials caused by steel joist framing installation.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 05 12 23 – Structural Steel for Buildings.

.2 Section 05 21 00 – Steel Joist Framing.

.3 Section 05 50 00 – Metal Fabrications.

.4 Section 05 51 29 – Metal Stairs and Ladders.

1.2 REFERENCES

.1 All references to be the latest edition as of the date indicated on the specifications.

.2 ASTM International

.1 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 ASTM A792/A792M, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

.3 Canada Green Building Council (CaGBC)

.1 LEED Canada-NC Version 1.0, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations (including Addendum).

.4 Canadian General Standards Board (CGSB)

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

.5 CSA International

.1 CSA C22.2 No.79, Cellular Metal and Cellular Concrete Floor Raceways and Fittings.

.2 CSA S16, Design of Steel Structures.

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

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

.5 CSA W55.3, Certification of Companies for Resistance Welding of Steel and Aluminum.

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

.6 Canadian Sheet Steel Building Institute (CSSBI)

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

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

.7 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards

.1 SCAQMD Rule 1113, Architectural Coatings.

.2 SCAQMD Rule 1168, Adhesives and Sealants Applications.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for steel decking and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by Professional Engineer registered or licensed in the Province of Manitoba, Canada.

.2 Submit design calculations if requested by Contract Administrator.

.3 Indicate deck plan, profile, dimensions, base steel thickness, metallic coating designation, connections to supports and spacings, projections, openings, reinforcement details and accessories.

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

.4 Sustainable Design Submittals:

.1 LEED Canada-NC Version 1.0 Submittals: in accordance with Section 01 35 20 - LEED Sustainable Requirements.

.2 Construction Waste Management:

.1 Submit project Waste Management Plan and Waste Reduction Workplan highlighting recycling and salvage requirements in accordance with Section 01 35 20 – LEED Sustainable Requirements.

.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates in accordance with Section 01 35 20 – LEED Sustainable Requirements.

.3 Recycled Content:

.1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project in accordance with Section 01 35 20 – LEED Sustainable Requirements.

.4 Regional Materials: submit evidence that project incorporates required percentage of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project in accordance with Section 01 35 20 – LEED Sustainable Requirements.

.5 Low-Emitting Materials:

.1 Submit listing of adhesives, sealants, paints and coatings used in building, comply with VOC and chemical component limits or restrictions 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 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off the ground, in a dry location and in accordance with manufacturer's recommendations.

.2 Store and protect decking from nicks, scratches, blemishes and other damage.

.3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan and Waste Reduction Workplan related to Work of this Section and in accordance with Section 01 35 20 - LEED Sustainable Requirements.

.5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding and packaging materials as specified Section 01 35 20 LEED Sustainable Requirements and 01 74 19 Waste Management and Disposal.

Part 2 Products

2.1 DESIGN CRITERIA

.1 Design steel deck to CSA S136.

.2 Steel deck and connections to steel framing to carry dead, live and other loads including lateral loads, diaphragm action, composite deck action, and uplift as indicated.

.3 Deflection under specified live load not to exceed 1/240 of span, except that when gypsum board ceilings are hung directly from deck, live load deflection not to exceed 1/360 of span.

.4 Where vibration effects are to be controlled as indicated, dynamic characteristics of decking system to be designed to be in accordance with CSA S16.

2.2 MATERIALS

.1 Zinc-iron Alloy (ZF) coated steel sheet: to ASTM A653/A653M structural quality Grade 230, with ZF75 coating, for interior surfaces not exposed to weather, painted finish, 0.76 mm minimum base steel thickness.

.2 Decks to be painted: zinc-iron alloy coated decks suitable for finish painting.

.3 Zinc (Z) coated steel sheet: to ASTM A653/A653M structural quality Grade 230, with Z275 coating, for exterior surfaces exposed to weather, 0.76 mm minimum base steel thickness.

.4 Acoustic insulation: fibrous glass 17.5 kg/m³ density minimum profiled to suit deck flutes.

.5 Closures: in accordance with manufacturer's recommendations.

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

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

.1 VOC limit to SCAQMD and in accordance with Section 01 35 20 – LEED Sustainable Requirements.

.8 Caulking: to Section 07 92 00 - Joint Sealants.

2.3 TYPES OF DECKING

.1 Steel roof deck: 0.76 mm minimum base steel thickness, 38 mm maximum deep profile, interlocking side laps.

.2 Acoustic steel roof deck: 0.76 mm minimum base steel thickness, 38 mm maximum deep profile, non-cellular, perforated on vertical face of flutes, interlocking side laps. thickness.

.3 Composite steel floor deck: 0.76 mm minimum base steel thickness, 38 mm deep profile, embossed fluted profile, interlocking side laps.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for steel decking installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Contract Administrator.

.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 to proceed from Contract Administrator.

3.2 INSTALLATION

.1 Structural steel work: in accordance with CSA S136, 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.

3.3 ERECTION

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

.2 Lap ends: to 50 mm minimum.

.3 Immediately after deck is permanently secured in place, touch up metallic coated top surface with compatible primer where burned by welding.

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

.5 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.

.6 Place and support reinforcing steel as indicated.

3.4 CLOSURES

.1 Install closures in accordance with approved details.

3.5 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 to 300 mm as recommended by manufacturer, except as otherwise indicated.

.3 For deck openings with any one dimension greater than 300 mm and for areas of concentrated load, reinforce in accordance with structural framing details indicated on the drawings, except as otherwise indicated.

3.6 CONNECTIONS

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

3.7 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 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal and 01 35 20 - LEED Sustainable Requirements.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.8 PROTECTION

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

.2 Repair damage to adjacent materials caused by steel decking installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

- .1 ASTM A53/A53M-[02], Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Steamless.
- .2 ASTM A269-[02], Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- .3 ASTM A307-[02], Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.2 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-1.40-[97], Anti-corrosive Structural Steel Alkyd Primer.
- .2 CAN/CGSB-1.181-[92], Ready-Mixed, Organic Zinc-Rich Coating.

.3 Canadian Standards Association (CSA International)

- .1 CAN/CSA-G40.20/G40.21-[98], General Requirements for Rolled or Welded Structural Quality Steel.
- .2 CAN/CSA-G164-[M92(R1998)], Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CAN/CSA-S16.1-[01], Limit States Design of Steel Structures.
- .4 CSA W48-[01], Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
- .5 CSA W59-[1989(R2001)],Welded Steel Construction (Metal Arc Welding) (Imperial Version).

.4 The Environmental Choice Program

- .1 CCD-047a-[98], Paints, Surface Coatings.
- .2 CCD-048-[98], Surface Coatings - Recycled Water-borne.

.1 Canada Green Building Council (CaGBC)

- .1 LEED Canada Reference Guide for Green Building Design and Construction 2009

1.2 SUBMITTALS

.1 Product Data:

- .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets. Indicate VOC's:
  - .1 For finishes, coatings, primers and paints.

.2 Shop Drawings

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

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

1.3 QUALITY ASSURANCE

.1 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Packing, Shipping, Handling and Unloading:

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

.2 Storage and Protection:

.1 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job Site.

.2 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

.1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade as indicated.

.2 Steel pipe: to ASTM A53/A53M standard weight, black finish.

.3 Welding materials: to CSA W59.

.4 Welding electrodes: to CSA W48 Series.

.5 Bolts and anchor bolts: to ASTM A307.

.6 Aluminum sheet: plain, 16 gauge minimum thickness, powder coated finish, colour to be determined.

.7 Stainless steel tubing: to ASTM A269, Commercial grade.

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

2.2 FABRICATION

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

.2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.

.3 Where possible, fit and shop assemble Work, ready for erection.

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

2.3 FINISHES

.1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m^2 to CAN/CSA-G164.

.2 Chromium plating: chrome on steel with plating sequence of 0.009 mm thickness of copper 0.010 mm thickness of nickel and 0.0025 mm thickness of chromium.

.3 Shop coat primer: to CAN/CGSB-1.40.

.4 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.

.5 High Build Epoxy Coating: to CAN/CGAB – 1.153.

2.4 ISOLATION COATING

.1 Isolate aluminum from following components, by means of bituminous paint:

.1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.

.2 Concrete, mortar and masonry.

.3 Wood.

2.5 SHOP PAINTING

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

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

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

2.6 ANGLE LINTELS

.1 Steel angles: galvanized prime painted sizes indicated for openings. Provide 150 mm minimum bearing at ends.

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

.3 For non stainless steel angle lintels, apply one shop coat of primer and finish to Section 09 91 23 – Interior Painting.

2.7 PIPE RAILINGS

.1 Steel pipe: sizes as indicated.

.2 Shop coat prime interior railings after fabrication. Apply high build epoxy coating after fabrication. Shop coat prime exterior railings after fabrication and finish to Section 09 91 23 – Interior Painting.

2.8 STAIRS, STAIR RAILINGS, STAIR PANS

.1 Fabricate according to Section 05 51 29 – Metal Stairs and Ladders.

2.9 ACCESS LADDERS

.1 Fabricate according to Section 05 51 29 – Metal Stairs and Ladders.

2.10 CORNER GUARDS

.1 Steel angle: sizes and thicknesses as indicated.

.2 Finish: brushed stainless steel.

2.11 CHANNEL FRAMES

.1 Fabricate frames from steel, sizes of channel and opening as indicated.

.2 Weld channels together to form continuous frame for jambs and head of openings, sizes as indicated.

.3 Shop coat prime interior channel frames after fabrication. Shop coat prime exterior channel frames after fabrication and apply a high build epoxy coating finish Section 09 91 23 – Interior Painting.

2.12 BENCH, RAIL AND COUNTER SUPPORTS

.1 Fabricate bench leg, rails and counter supports from steel, sizes as indicated.

.2 Shop coat prime interior channel frames after fabrication. Shop coat prime exterior channel frames after fabrication and apply a high build epoxy coating finish Section 09 91 23 – Interior Painting.

2.13 EXTERIOR ROOF SIGNAGE SUPPORT ARMATURE

.1 Fabricate exterior roof signage support armature from aluminum square tubing, sizes as indicated.

.2 Provide 6 mm thick x 75 mm wide x 150 mm long aluminum mounting pad welded to bracket.

Part 3 Execution

3.1 ERECTION

.1 Do welding Work in accordance with CSA W59 unless specified otherwise.

.2 Erect metalWork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

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

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

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

.6 Make field connections with bolts to CAN/CSA-S16.1, or weld.

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

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

.9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

.10 Touch-up high build epoxy coated finishes.

3.2 INSTALLATION OF PIPE RAILINGS

.1 Install pipe railings to stairs as indicated.

.2 Set railing standards in concrete. Grout to fill hole. Trowel surface smooth and flush with adjacent surfaces.

3.3 INSTALLATION OF CORNER GUARDS

.1 Install corner guards in locations as indicated.

3.4 INSTALALTION OF BENCH AND COUNTER SUPPORTS

.1 Install bench and counter supports in locations as indicated.

3.5 INSTALLATION OF EXTERIOR ROOF SIGNAGE SUPPORT ARMATURE

.1 Install exterior roof signage armature as indicated.

.2 Mounting pad to be complete with neoprene gasket. Holes to be predrilled and filled with cold complaint mastic sealant.

.3 Roof signage lettering to be plug welded to armature and ground smooth. Letters to be painted black with ‘autophoretic’ coating.

3.6 INSTALLATION CHANNEL FRAMES

.1 Install steel channel frames to openings as indicated.

3.7 CLEANING

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

.2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.8 PROTECTION

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

.2 Repair damage to adjacent materials caused by metal fabrications installation

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American National Standards Institute/National Association of Architectural Metal Manufacturers (ANSI/NAAMM)

.1 ANSI/NAAMM MBG531, Metal Bar Grating Manual.

.2 American Society for Testing and Materials,(ASTM)

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

.2 ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.3 ASTM A325M, Specification for Structural Bolts, Steel, Heat Treated, 830 MPa Minimum Tensile Strength.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.40, Anti-corrosive Structural Steel Alkyd Primer.

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

.4 Canadian Standards Association (CSA)

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

.2 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 CSA W59,Welded Steel Construction (Metal Arc Welding/Imperial Version).

.5 National Association of Architectural Metal Manufactures (NAAMM)

.1 AMP 510, Metal Stair Manual.

.6 Steel Structures Painting Council (SSPC)

.1 Systems and Specifications Manual, Volume 2.

.1 Canada Green Building Council (CaGBC)

.1 LEED Canada Reference Guide for Green Building Design and Construction 2009

1.2 SYSTEM REQUIREMENTS

.1 Design metal stair, balustrade and landing construction and connections to NBC vertical and horizontal live load requirements.

.2 Detail and fabricate stairs to NAAMM Metal Stairs Manual.

1.3 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets. Indicate VOC's:

.1 For finishes, coatings, primers and paints.

.2 Shop Drawings

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

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

1.4 QUALITY ASSURANCE

.1 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Packing, Shipping, Handling and Unloading:

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

.2 Storage and Protection:

.1 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job Site.

.2 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

.1 Steel sections: to CAN/CSA-G40.20/G40.21 Grade 300 W.

.2 Floor plate: to CAN/CSA-G40.20/G40.21, Grade 260 W.

.1 Thickness: 3 mm.

.3 Steel pipe: to ASTM A53/A53M, standard weight, schedule 40 seamless black.

.4 Steel tubing: to CAN/CSA-G40.20/G40.21, Grade 300W, square, wall thickness, sizes and dimensions as indicated.

.5 Steel bars to CAN/CSA-G40.21, 20 mm diameter.

.6 Welding materials: to CSA W59.

.7 Bolts: to ASTM A307.

.8 High strength bolts: to ASTM A325M.

2.2 FABRICATION

.1 Fabricate to NAAMM, Metal Stair Manual.

.2 Weld connections where possible, otherwise bolt connections. Countersink exposed fastenings, cut off bolts flush with nuts. Make exposed connections of same material, colour and finish as base material on which they occur.

.3 Accurately form connections with exposed faces flush; mitres and joints tight. Make risers of equal height.

.4 Grind or file exposed welds and steel sections smooth.

.5 Shop fabricate stairs in sections as large and complete as practicable.

2.3 STEEL PAN STAIRS

.1 Fabricate stairs with closed riser steel pan construction.

.2 Form treads and risers from 3 mm thick steel plate. Secure treads and risers to L 35 x 35 x 5 horizontal and vertical welded to stringers.

.3 Form wall stringers from MC 310 x 15.8.

.4 Form outer stringers from MC 310 x 15.8 with 5 mm thick plate fascia welded on.

.5 Form landings from 3 mm thick steel plate, reinforced by L 55 x 55 x 6 mm spaced at 400 mm on centre.

.6 Provide clip angles for fastening of furring channels, where applied finish is indicated for underside of stairs and landings.

.7 Extend stringers around mid-landings to form steel base.

.8 Close ends of stringers where exposed.

2.4 PIPE/TUBING BALUSTRADES

.1 Construct balusters and handrails from steel pipe steel tubing or steel tubing.

.2 Cap and weld exposed ends of balusters and handrails.

.3 Terminate at abutting wall with end flange.

2.5 BAR BALUSTRADES

.1 Construct bar balustrades as follows:

.1 Balusters: 20 mm diameter steel.

.2 Top rail: 28 mm diameter standard steel pipe.

.3 Bottom rail: 38 mm diameter standard steel pipe.

.4 Bottom rail supports: same as pipe rail.

.2 Weld balustrades to stringers as indicated.

2.6 ACCESS LADDERS INTERIOR/EXTERIOR

.1 Stringers: 55 x 55 x 6 mm thick, steel angle.

.2 Steel Rungs: 20 mm diameter, welded to stringers at 300 mm on centre.

.3 Brackets: sizes and shapes as indicated, weld to stringers at 1200 mm c.c., complete with fixing anchors.

.4 Cover Guard: metal plate guard cover, min 3mm thick c/w hinges @ 900 o.c. and hasp to accept Pad lock (lock NIC).

.5 Shop coat prime interior ladders after fabrication. Shop coat prime exterior ladders after fabrication and apply a high build epoxy coating finish to Section 09 91 23 – Interior Painting.

2.7 FINISHES

.1 Shop coat primer: to CAN/CGSB-1.40.

.2 Apply a high build epoxy coating finish to Section 09 91 23 – Interior Painting.

2.8 SHOP PAINTING

.1 Clean surfaces in accordance with Steel Structures Painting Council Manual Volume 2.

.2 Apply one coat of shop primer except interior surfaces of pans.

.3 Apply two coats of primer of different colours to parts inaccessible after final assembly.

.4 Use primer as prepared by manufacturer without thinning or adding admixtures. Paint on dry surfaces, free from rust, scale, grease, do not paint when temperature is below 7 degrees C.

.5 Do not paint surfaces to be field welded.

Part 3 Execution

3.1 INSTALLATION OF STAIRS

.1 Install in accordance with NAAMM, Metal Stair Manual.

.2 Install plumb and true in exact locations, using welded connections wherever possible to provide rigid structure. Provide anchor bolts, bolts and plates for connecting stairs to structure.

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

.4 Do welding Work in accordance with CSA W59 unless specified otherwise.

.5 Touch up shop primer to bolts, welds, and burned or scratched surfaces at completion of erection.

3.2 INSTALLATION OF ACCESS LADDERS

.1 Install access ladders in locations as indicated.

.2 Erect ladders 200mm clear of wall on bracket supports.

3.3 CLEANING

.1 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.

.2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.4 PROTECTION

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

.2 Repair damage to adjacent materials caused by metal stairs and ladders installation.

END OF SECTION