1. GENERAL

1.1. REFERENCES

.1 ASTM International Inc.
- .1 ASTM A 36/A 36M-08, Standard Specification for Carbon Structural Steel.
- .2 ASTM A 193/A 193M-08, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature or High-Pressure Service and Other Special Purpose Applications.
- .3 ASTM A 307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .4 ASTM A 325-07a, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- .5 ASTM A 325M-08, Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength Metric.
- .6 ASTM A 490M-04ae, Standard Specification for High-Strength Steel Structural Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints Metric.

.2 Canada Green Building Council (CaGBC)
- .1 LEED Canada NC 2009, LEED: Green Building Rating System Reference Package for New Construction and Major Renovations (including Addendum).

.3 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-85.10-99, 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/G40.21-04, 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-S16-01(R2007), Limit States Design of Steel Structures.
- .4 CAN/CSA-S136-07, North American Specifications for the Design of Cold Formed Steel Structural Members.
- .5 CSA W47.1-03, Certification of Companies for Fusion Welding of Steel.
- .6 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding.
- .7 CSA W55.3-1965(R2003), Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
- .8 CSA W59-03, Welded Steel Construction (Metal Arc Welding).

.6 Master Painters Institute
- .1 MPI-INT 5.1-08, Structural Steel and Metal Fabrications.
- .2 MPI-EXT 5.1-08, 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-6-06, Commercial Blast Cleaning.

1.2. ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Co-ordinate submittal requirements and provide submittals required by Section 01 35 20 – LEED Sustainable Requirements.

.3 Shop Drawings:
- .1 Provide drawings stamped and signed by professional engineer registered or licensed in the Province of Manitoba, Canada.

.4 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.

.5 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.

.6 Source Quality Control Submittals:
.1 Submit 2 copies of mil test report 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 the project.

.7 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.

1.3. 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 in Section 01 35 20 LEED Sustainable Requirements and 01 74 19 Waste Management and Disposal.

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 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.

.4 Submit sketches and design calculations stamped and signed by qualified professional engineer licensed in the Province of Manitoba, Canada for non-standard connections.

2.2. MATERIALS

.1 Structural steel: to CSA-G40.20/G40.21 Grade 350W Class C and CAN/CSA-S136.

.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 and CSA W59 and certified by Canadian Welding Bureau.
.5 Shop paint primer: to CISC/CPMA 2-75 solvent reducible alkyd, grey.
.6 Hot dip galvanizing: galvanize steel, where indicated, to CAN/CSA-G164, minimum zinc coating of 600 g/m².
.7 Shear studs: to CSA W59, Appendix H.

2.3. FABRICATION

.1 Fabricate structural steel in accordance with CAN/CSA-S16 CAN/CSA-S136 and in accordance with approved shop drawings.
.2 Install shear studs in accordance with CSA W59.
.3 Continuously seal members by continuous welds where indicated. Grind smooth.
.4 Provide holes in top bottom flanges. Weld threaded studs to top bottom flanges for attachment of wood nailers where indicated in drawings.

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. APPLICATION

.1 Manufacturer's Instructions: comply with manufacturers 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 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. CONNECTION TO EXISTING WORK

.1 Verify dimensions and condition of existing work, report discrepancies and potential problem areas to Contract Administrator for direction before commencing fabrication.

3.4. 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.

3.5. ERECTION

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

3.6. FIELD QUALITY CONTROL

.1 Inspection and testing of materials and workmanship will be carried out by testing laboratory approved by Contract Administrator.
.2 Provide safe access and working areas for testing on site, as required by testing agency and as authorized by 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.

3.7. FIELD PAINTING

.1 Paint in accordance with Section 09 91 00 – Painting & 09 97 19 – Painting Exterior Metal Surfaces.
  .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.

3.8. 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 35 20 – LEED Sustainable Requirements and Section 01 74 19 – Waste Management and Disposal.

END OF SECTION.

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

1.2. REFERENCES

.1 Canada Green Building Council (CaGBC)
  .1 LEED Canada NC 2009, LEED: Green Building Rating System Reference Package for New Construction and Major Renovations (including Addendum).
.2 Canadian General Standards Board (CGSB)
  .1 .1 CAN/CGSB-85.10-[99], Protective Coatings for Metals.
.3 CSA International
  .1 CSA G40.20/G40.21-[04(R2009)], General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  .2 CSA S16-[09], Design of Steel Structures.
  .3 CSA S136-[07], North American Specification for the Design of Cold Formed Steel Structural Members.
  .4 CSA W47.1-[09], Certification of Companies for Fusion Welding of Steel.
  .5 CSA W55.3-[08], Certificate of Companies for Resistance Welding of Steel and Aluminum.
  .6 CSA W59-[M03(R2008)], Welded Steel Construction (Metal Arc Welding) [Metric].

1.3. ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
.2 Co-ordinate submittal requirements and provide submittals required by Section 01 35 20 – LEED Sustainable Requirements.
.3 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.
.4 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 on erection drawings, relevant details such as joist mark, depth, spacing, bridging lines, bearing, anchorage and details.
  .4 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.

1.4. QUALITY ASSURANCE

.1 Submit two 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 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 ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

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

.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 in Section 01 35 20 LEED Sustainable Requirements and 01 74 19 Waste Management and Disposal.

2. PRODUCTS

2.1. DESIGN CRITERIA

.1 Design steel joists to carry loads indicated in joist schedule shown on drawings to CSA S16/CSA S136.

.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 as indicated on drawings.

.5 Limit floor joist deflection due to specified live load as indicated on drawings.

2.2. MATERIALS

.1 Open web steel joists: to CSA S16/CSA S136 .

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

.3 Welding materials: to CSA W59.

.4 Shop paint primer: to MPI - INT 5.1A

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

2.3. FABRICATION

.1 Fabricate steel joists and accessories as indicated in accordance with CSA S16/CSA S136 and in accordance with approved shop drawings.

.2 Weld in accordance with CSA W59.

.3 Provide top/bottom chord extensions where indicated.

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

.5 Weld studs to top/bottom chords for attachment purposes as indicated.

.6 Install shear studs in accordance with CSA W59.

2.4. SHOP PAINTING

.1 Clean, prepare and shop prime surfaces of steel joists to CSA S16 and SSPC SP6.

.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 of .065 mm to .080 mm maximum 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.

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.
.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/CSA S136.
.2 Do welding: in accordance with CSA W59.
.3 Ensure installers are certified to CSA W47.1 for fusion welding and/or CSA W55.3 for resistance welding.
.4 Submit certification that welded joints are qualified by Canadian Welding Bureau.

3.3. ERECTION

.1 Erect steel joists as indicated to CSA S16 and in accordance with approved 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.

3.4. FIELD PAINTING

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

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 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 35 20 – LEED Sustainable Requirements and Section 01 74 19 – Waste Management and Disposal.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6. PROTECTION

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

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

END OF SECTION.

1. GENERAL

1.1. RELATED REQUIREMENTS

.1 Section 05 12 23 – Structural Steel for Buildings
.2 Section 05 50 00 – Metal Fabrications
.3 Section 13 32 13 – Metal Space Frames

1.2. REFERENCES

.1 ASTM International
  .1 ASTM A 653/A 653M-[09a], Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  .2 ASTM A 792/A 792M-[09a], Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
.2 Canada Green Building Council (CaGBC)
  .1 LEED Canada NC 2009, LEED: Green Building Rating System Reference Package for New Construction and Major Renovations (including Addendum).
.3 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB-1.181-[99], Ready-Mixed Organic Zinc-Rich Coating.
.4 CSA International
  .1 CSA C22.2 No.79-[1978(R2008)], Cellular Metal and Cellular Concrete Floor Raceways and Fittings.
  .2 CSA S16-[09], Design of Steel Structures.
  .3 CSA S136-[07], North American Specification for the Design of Cold Formed Steel Structural Members.
  .4 CSA W47.1-[09], Certification of Companies for Fusion Welding of Steel Structures.
  .5 CSA W55.3-[08], Certification of Companies for Resistance Welding of Steel and Aluminum.
  .6 CSA W59-[03(R2008)], Welded Steel Construction, (Metal Arc Welding).
.5 Canadian Sheet Steel Building Institute (CSSBI)
  .1 CSSBI 10M-[08], Standard for Steel Roof Deck.
  .2 CSSBI 12M-[08], Standard for Composite Steel Deck.
.6 Green Seal Environmental Standards (GS)
  .1 GS-11-[2008, 2nd Edition], Paints and Coatings.

1.3. ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
.2 Co-ordinate submittal requirements and provide submittals required by Section 01 35 20 – LEED Sustainable Requirements.
.3 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.
.4 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 spacing, 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.

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 ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

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

.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 in Section 01 35 20 LEED Sustainable Requirements and 01 74 19 Waste Management and Disposal.

2. PRODUCTS

2.1. DESIGN CRITERIA

.1 Design steel deck to CSA S136, CSSBI 10M and CSSBI 12M.

.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 design 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/m^3 density minimum profiled to suit deck flutes.

.5 Closures: in accordance with manufacture’s recommendations.

.1 Neoprene closures along gridline B above c.i.p. concrete wall, set flush to north side of wall.

.6 Cover plates, cell closures and flashings: steel sheet with minimum base steel thickness of 0.76mm 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: minimum 0.76mm base steel thickness, 38mm maximum deep profile, interlocking side laps.

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

.3 Composite steel floor deck: minimum 0.76mm minimum base thickness, 38mm deep profile, embossed fluted profile, interlocking side laps.
.4 Canopy steel roof deck: minimum 0.76mm base steel thickness, 76mm maximum deep profile, interlocking side laps, caulk underside of panel joints as indicated.

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 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.

3.3. ERECTION

.1 Erect steel deck as indicated and in accordance with CSA S136 CSSBI 10M and CSSBI 12M and in accordance with approved erection drawings.
.2 Bear deck on steel supports with 38mm minimum bearing. Align and level. Lap ends 50mm over supports
.3 Fasten ribbed deck to steel support members at ends and intermediate supports with fusion welds through weld washers at 305mm on centre maximum, parallel with the deck flute and at each transverse flute.
.4 Mechanically clinch male/female side laps at 152mm on centre maximum.
.5 No reinforcement required for openings cut in deck which are smaller than 150mm square.
.6 Frame deck openings with any one dimension between 150 to 300mm as recommended by manufacturer, except as otherwise indicated.
.7 For deck openings with any one dimension greater than 300mm and for areas of concentrated load, reinforce in accordance with structural framing details indicated on the drawings, except as otherwise indicated.
.8 Weld and test stud shear connectors through steel deck to steel joists/beams below in accordance with CSA W59.
.9 Immediately after deck is permanently secured in place, touch up metallic coated top surface with compatible primer where burned by welding.
.10 Prior to concrete placement, steel deck to be free of soil, debris, standing water, loose mil scale and other foreign matter.
.11 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.
.12 Place and support reinforcing steel as indicated.

3.4. FIELD PAINTING

.2 Paint exposed underside and exterior canopy in accordance with Section 09 91 00 – Painting and 09 97 19 – Painting Exterior Metal Surfaces.

3.5. CLOSURES

.1 Install closures in accordance with approved details.

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 35 20 – LEED Sustainable Requirements and Section 01 74 19 – Waste Management and Disposal.
  .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.

1. GENERAL

1.1. RELATED REQUIREMENTS

.1 Section 05 51 29 – Metal Stairs and Ladders
.2 Section 09 91 00 – Painting
.3 Section 09 97 19 – Painting Exterior Metal Surfaces

1.2. REFERENCES

1.3. **SPEC NOTE**: Edit the following paragraphs for this specific project.

.1 ASTM International
  .1 ASTM A 53/A 53M-[07], Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
  .2 ASTM A 307-[07b], Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
.2 Canada Green Building Council (CaGBC)
  .1 LEED Canada NC 2009, LEED: Green Building Rating System Reference Package for New Construction and Major Renovations (including Addendum).
.3 CSA International
  .1 CSA G40.20/G40.21-[04(R2009)], 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 CSA S16-[09], Design of Steel Structures.
  .4 CSA W48-[06], Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
  .5 CSA W59-[M03(R2008)], Welded Steel Construction (Metal Arc Welding) [Metric].
.4 Environmental Choice Program
  .1 CCD-047-[98(R2005)], Architectural Surface Coatings.
  .2 CCD-048-[98(R2006)], Surface Coatings - Recycled Water-borne.
.5 Green Seal Environmental Standards (GS)
.6 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  .1 Material Safety Data Sheets (MSDS).
.7 The Master Painters Institute (MPI)
  .1 Architectural Painting Specification Manual - [current edition].

1.4. ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
.2 Co-ordinate submittal requirements and provide submittals required by Section 01 35 20 – LEED Sustainable Requirements.
.3 Product Data:
  .1 Submit manufacturer's instructions, printed product literature and data sheets for sections, plates, pipe, tubing, bolts and include product characteristics, performance criteria, physical size, finish and limitations.
  .2 Submit two copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
    .1 For finishes, coatings, primers, and paints applied on site: indicate VOC concentration in g/L.
.4 Shop Drawings:
  .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Manitoba, Canada.
  .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.5. QUALITY ASSURANCE

.1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
.2 Certifications: submit 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.

1.6. 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 ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  .2 Replace defective or damaged materials with new.
.4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding and packaging materials as specified in Section 01 35 20 LEED Sustainable Requirements and 01 74 19 Waste Management and Disposal.
.5 Separate and recycle waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

2. PRODUCTS

2.1. MATERIALS

.1 Steel sections and plates: to CSA G40.20/G40.21, Grade 300W.
.2 Steel pipe: to ASTM A 53/A 53M standard weight, black finish.
.3 Welding materials: to CSA W59.
.4 Welding electrodes: to CSA W48 Series.
.5 Bolts and anchor bolts: to ASTM A 307.
.6 Stainless steel tubing: to ASTM A 269, Type 302 commercial grade, seamless welded with AISI No. 4 finish.
.7 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/m² to CAN/CSA-G164.
.2 Chromium plating: chrome on steel with plating sequence of 0.009mm thickness of copper 0.010mm thickness of nickel and 0.0025mm thickness of chromium.
.3 Shop coat primer: to CAN/CBSB-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 Primer: VOC limit 250g/L maximum to GS-11, CCD-047a, CCD-048.
.2 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.
.3 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.
.4 Clean surfaces to be field welded; do not paint.

2.6. ANGLE LINTELS

.1 Steel angles: 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 Finish: shop painted.
.1 Primer: VOC limit 250 g/L maximum to GS-11 when applied onsite.

2.7. STAIRS, STAIR RAILINGS, STAIR PANS

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

2.8. CORNER GUARDS

.1 Steel angle: sizes and thickness as indicated
.2 Finish: brushed stainless steel

2.9. BENCH, RAIL AND COUNTER SUPPORTS

.1 Fabricate bench 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 00 – Painting.

2.10. BAR COAT RACK

.1 Fabricate bar coat rack from steel and stainless steel, sizes as indicated.
.2 Provide s.s. countersunk flat screws for attachment to embedded pipe in cmu/conc. wall.
.3 Shop coat prime embedded pipe after fabrication and apply a high build epoxy coating finish Section 09 91 00 – Painting.

3. EXECUTION

3.1. EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal fabrications installation in accordance with manufacturer's written instructions.
.1 Inform Contract Administrator of unacceptable conditions immediately upon discovery.
.2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Contract Administrator.

3.2. 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 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 Supply components for work by other trades in accordance with shop drawings and schedule.

.6 Make field connections with bolts to CSA S16 or Weld field connection.

.7 Deliver items over for casting into concrete and building into masonry together with setting templates to appropriate location and construction personnel.

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

.1 Primer: maximum VOC limit 250 g/L to GS-11.

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

.1 Primer: maximum VOC limit 250 g/L to GS-11.

3.3. FIELD PAINTING

.1 Paint in accordance with Section 09 91 00 – Painting & 09 97 19 – Painting Exterior Metal Surfaces.

.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.

3.4. 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 .

3.5. 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.

1. GENERAL

1.1. RELATED REQUIREMENTS

.1 Section 05 50 00 – Metal Fabrications
.2 Section 09 91 00 – Painting

1.2. REFERENCES

.1 ASTM International
  .1 ASTM A 53/A 53M-[07], Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
  .2 ASTM A 307-[07b], Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  .3 ASTM A 325M-[09], Standard Specification for Structural Bolts, Steel, Heat Treated, 830 MPa Minimum Tensile Strength [Metric].
  .4 ASTM B 209M, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]
.2 Canada Green Building Council (CaGBC)
  .1 LEED Canada NC 2009, LEED: Green Building Rating System Reference Package for New Construction and Major Renovations (including Addendum).
.3 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB-1.40-[97], Anti-corrosive Structural Steel Alkyd Primer.
  .2 CAN/CGSB-1.181-[99], Ready-Mixed Organic Zinc-Rich Coating.
  .3 CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.
.4 CSA International
  .1 CSA G40.20/G40.21-[04(R2009)], 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 CSA W59-[03(R2008)], Welded Steel Construction (Metal Arc Welding).
  .4 CSA W59.2 –M1991, Welded Aluminum Construction.
.5 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  .1 Material Safety Data Sheets (MSDS).
.6 National Association of Architectural Metal Manufactures (NAAMM)
  .1 AMP 510-[92], Metal Stair Manual.
.7 The Society for Protective Coatings (SSPC)
  .1 Systems and Specifications Manual, Volume 2, 2008 Edition.

1.3. ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
.2 Co-ordinate submittal requirements and provide submittals required by Section 01 35 20 – LEED Sustainable Requirements.
.3 Shop Drawings:
  .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Manitoba, Canada.
  .2 Indicate materials, core thickness, finishes, connections, joints, and methods 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 and 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 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 ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect stairs from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

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

2. PRODUCTS

2.1. SYSTEM DESCRIPTION

.1 Fabricate stair assembly to support a uniform live load of 100lbs/sq ft and a concentrated load of 300 lbs/sq ft with deflection of stringer or landing framing not to exceed 1/180 of span as per NBC. Test in accordance with ASTM B209M-10.

.2 Railing assembly, wall rails, and attachments to resist lateral force of 300 lbs at any point without damage or permanent set as per NBC. Test in accordance with ASTM B209M-10.

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

2.2. MATERIALS

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

.2 Steel plate: to CSA G40.20/G40.21, Grade 260 W.

.3 Floor plate: to CSA G40.20/G40.21, Grade 260 W.

.4 Steel tubing: to CSA G40.20/G40.21, Grade 260W round wall thickness, sizes and dimensions as indicated.

.5 Welding materials: to CSA W59.2 –M1991 (C2013)

.6 Bolts: to ASTM A 307.

.7 High strength bolts: to ASTM A 325M.

2.3. FABRICATION

.1 Fabricate in accordance with 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, color and finish as base material on which they occur.

.3 Accurately form connections with exposed faces flush:

.1 Make miters and joints tight.

.2 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.

2.4. PLATE GRATING STAIRS

.1 Form steel grating treads from metal bar grating to profile indicated and secure to stringers and supports as indicated. Form landings of steel grating and reinforce as required.
.2 Form stringers from 11”x1-1/4”x1/8” bent steel plate.

2.5. PIPE/TUBING BALUSTRADES

.1 Construct balusters and handrails from steel pipe or steel tubing.
.2 Cap and weld exposed ends of balusters and handrails.
.3 Terminate at abutting wall with end flange.

2.6. ACCESS LADDERS

.1 Stringers: 55x55x6mm thick, steel angle.
.2 Steel rungs: 20mm diameter, welded to stringers at 300mm on centre.
.3 Brackets: sizes and shapes as indicated, weld to stringers at 1200mm o.c., complete with fixing anchors.
.4 Cover guard: metal plate guard cover, min 3mm thick c/w hinges at 900mm o.c. and eyelet to accept padlock.
.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 00 – Painting.

2.7. FINISHES

.1 Shop coat primer: to CAN/CGSB-1.40.
.2 Apply a high build epoxy coating finsh to Section 09 91 00 – 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, and do not paint when temperature is below 7 degrees C.
.5 Do not paint surfaces to be field welded.

3. EXECUTION

3.1. EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal stairs and ladders installation in accordance with manufacturer's written instructions.
  .1 Inform Contract Administrator of unacceptable conditions immediately upon discovery.
  .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Contract Administrator.

3.2. 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.

3.3. FIELD PAINTING

.1 Paint in accordance with Section 09 91 00 – Painting & 09 97 19 – Painting Exterior Metal Surfaces.
  .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.

3.4. CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  .1 Leave Work area clean at end of each day.
.2 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.
.3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.5. 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.