LIGHT WEIGHT STEEL FRAMING

1. GENERAL

1.1 Description of System

.1 Wind Bearing Studs

.1 Wall studs subjected to lateral loads (no axial loads other than self-weight and the weight of applied finishes).

.2 Steel bridging.

.3 Top and bottom track.

.4 Head, sill and jamb members for wall openings.

.5 Stud, bridging and track connections.

.6 Top and bottom connections to the main structure including detailing to accommodate floor and/or roof deflections.

1.2 Quality Assurance

.1 Retain a Professional Engineer registered in the province of the Work to engineer the work of this Section, to prepare, seal and sign shop drawings; and to perform field review. Shop drawings shall show both design and installation requirements.

.2 Do steel welding to applicable CSA S136, CSA W59 and ANSI/AWS D1.3 requirements, by welders qualified for the base material types and thicknesses that are to be welded and retained by companies certified by the Canadian Welding Bureau to CSA W47.1.

1.3 engineering Design Criteria

.1 Base engineering design on Limit States Design principles using factored loads and resistances.

.2 Loads and Load Factors: In accordance with the requirements of the building code.

.3 Resistances and Resistance Factors: In accordance with the requirement of the building code and CSA-S136.

.4 Fire Resistance Assemblies: Conform to the requirements of fire rated assemblies which have been tested in accordance with CAN/ULC S101 and provide fire resistance ratings indicated.

.5 Stud Depths: Shown on the drawings. Adjust stud and joist material thicknesses and spacings, as required by the design criteria. Use greater or lesser stud and joist depths only if approved by the Contract Administrator.

.6 Framing Member Spacings: Maintain maximum spacings, use lesser spacings if required by engineering design.

.1 Wall Studs: 400 mm.

.7 Farming Member Thicknesses: Minimum core thickness without coating. Use greater thickness if required by engineering design.

.1 Stud and Track: 0.84 mm.

.2 Bridging Channels: 1.22 mm.

.3 Clip Angles: 1.52 mm.

.8 Maximum Flexural Deflections Under Live Or Wind Loads: L/360.

.9 Building Sway Due To All Effects: 1/400 of building height or 1/500 of storey height.

.10 Connections: Design connections to accommodate vertical deflection movement of the structure, building frame shortening and vertical tolerances without imposing axial loads onto the work of this Section.

.1 Limit free play and movement in connections perpendicular to the plane of the framing to plus/minus 0.5 mm (0.02") relative to the building structure.

.11 Design light weight steel framing components and assemblies to accommodate erection tolerances of the structure.

.12 Design bridging to prevent member rotation and member translation perpendicular to the minor axis. Provide for secondary stress effects due to torsion between lines of bridging. Do not rely on collateral sheathing to help restrain member rotation and translation perpendicular to the minor axis. Space bridging at 1500 mm centres over the entire span of members. User closer spacings to comply with engineering design.

.13 Design anchorage and splice details for bridging.

.14 Design for local loading due to anchorage of cladding and interior wall mounted fixtures where shown.

.15 Connections Between Framing Members: Bolts, welding or sheet metal screws.

.16 Anchor stud wall top and bottom tracks to the structure at a maximum spacing of 800 mm (32") o.c. Use closer spacings to comply with engineering design.

1.4 Submittals

.1 Shop Drawings: Bearing the stamp and signature of the professional engineer responsible for the engineering design of the work of this Section. Include:

.1 Shop details and erection diagrams.

.2 Member sizes, locations, thicknesses exclusive of coating, coatings, and material types.

.3 Connection details for attaching framing to itself and for attachment to the structure.

.4 Splice details where permitted.

.5 Dimensions, openings, requirements of related work and critical installation procedures.

.6 Temporary bracing required for erection purposes.

.7 Design loads.

.2 Mill Reports: Three certified copies of mill reports covering chemical and mechanical properties, and coating designation of steel used in this work.

.3 Submit product data for mechanical fasteners indicating sizes, load capacities and type of corrosion protection.

.4 Samples: Submit on request, three representative pieces of all framing component parts including mechanical fasteners if used.

.5 Engineering Calculations: Submit on request, three copies of engineering calculations or data verifying the capacity of the members, including masonry connectors if specified, and the ability of the assemblies to meet the design requirements.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Store steel members on blocking, pallets, platforms or other supports off the ground and in an upright position sufficiently braced to avoid damage from excessive bending.

.2 Protect work from corrosion, deformation, damage and deterioration when stored at job site. Keep work trusses free of dirt and other foreign matter.

1.6 PROJECT CONDITIONS

.1 During construction, adequately distribute all loads applied to framing members so as not to exceed the carrying capacity of any one joist, wall or other component.

2. PRODUCTS

2.1 MATERIALS

.1 Sheet Steel: CSA S136, identified as to specification, grade, mechanical properties and coating type and thickness, hot dip galvanized with metallic coatings conforming to one of the following:

.1 ASTM A653/A653M: Z275 coating.

.2 ASTM A792/A792M: 55% aluminium-zinc alloy AZM 150 coating.

.2 Gypsum Board: ASTM C1396/C1396M, paper faced, moisture resistant, regular and fire rated Type X core, 1200 mm (48") wide x maximum practical length, ends square cut, square edged base layer and taper edged face layer.

.3 Gypsum Board Screws: Type S-12, bugle head, self-tapping, rust-resistant, fine thread for heavy steel gauge.

2.2 Fasteners and Welds

.1 Bolts, Nuts and Washers: ASTM A307 or ASTM A325, hot dip galvanized.

.2 Fasteners and Screws: Minimum coating thickness of .008 mm of zinc. Other coatings providing equal or better corrosion protection may be used.

.3 Welding Materials: CSA W59.

.1 Welding Electrodes: 480 MPa minimum tensile strength.

.4 Zinc Rich Paint: CAN/CGSB-1.181.

2.3 Fabrication

.1 Except as noted herein, fabricated wall framing components shall conform to the requirements of CAN/CGSB-7.1.

.2 Provide cut outs centred in the webs of members to accommodate services and though-the-knockout style bridging. Limit un-reinforced cut outs to the dimensions in Table 1. The effect of cut-outs on the strength and stiffness of the member shall be considered. The distance from the centreline of the last un-reinforced cut-out to the end of the member shall be not less than 300 mm (12”).

TABLE 1 Allowable Dimensions for Un-reinforced Cut-Outs

Member Depth (mm)	Perpendicular to the Length of the Member (mm)	Parallel to the Length of the Member (mm)	Centre to Centre Spacing (mm)
92, 102	40 max.	105 max.	600 min.

.3 Length Tolerances For Members: Plus/minus 3 mm.

.4 Cross Sectional Geometry Tolerances For Members: Conform to Table 2.

TABLE 2 Cross Sectional Geometry Tolerances					
Type	Member Depth (mm)	Flange Width (mm)	Lip Length (mm)	Thickness (mm)	Corner Angles
Stud	-1, +2	-1, +2	-0, +4	The tolerance on delivered steel thickness shall conform to requirements of CSA S136	Plus/Minus 3 degrees

.5 Emboss, stamp with indelible ink or colour code on each steel member the steel thickness exclusive of metallic coating.

.6 Where sheathing is attached directly to the member flange, the minimum flange width shall be 31 mm.

3. EXECUTION

3.1 Examination

.1 Examine structure, substrates and installation conditions. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 Fasteners and Welds

.1 Insure that connected parts are in contact. Provide clamping before welding or installing screws as required.

.2 For material less than 3 mm (1/8") thick, the effective throats of welds shall not be less than the thickness of the thinnest connected part.

.3 Touch-up welds and coatings damaged by welding with zinc rich paint. Prior to touching-up prepare surface in accordance with paint manufacturer 's recommendations.

.4 Sheet metal screws shall be of the minimum diameter indicated on the shop drawings but not less than a #8.

.5 Penetration of sheet metal screws beyond joined materials shall be not less than 3 exposed threads.

.6 Sheet metal screw thread types, drilling capability and installation shall conform to the manufacturer 's recommendations.

.7 Sheet metal screws covered by sheathing materials shall have low profile heads.

.8 Install concrete anchors in accordance with manufacturer 's recommendations.

3.3 installation

.1 Methods of construction may be either stick built or panels either fabricated on or off site.

.2 Erect framing true and plumb within the specified tolerances. Employ temporary bracing wherever necessary to withstand all loads to which the structure may be subject during erection and subsequent construction. Leave temporary bracing in place as long as required for the safety and integrity of the structure. Ensure that during erection a margin of safety consistent with the requirements of the Building Code and CSA S136 exists in the uncompleted structure.

.3 Erection Tolerances: For the purposes of this Section, camber is defined as the deviation from straightness of a member or any portion of a member with respect to its major axis, and sweep is defined as the deviation from straightness of a member or any portion of a member with respect to its minor axis.

.1 Out of Plumb: Not to exceed 1/500th of the member length.

.2 Out of Straightness (Camber and Sweep): Not to exceed 1/1000th of the member length.

.4 Set studs into top and bottom tracks. The gap between the end of the stud and the web of the track shall not exceed 4 mm (0.16”).

.5 Align adjacent or abutting members in the same plane to within plus/minus 0.5 mm (0.02”) maximum.

.6 Stud Spacing: Not to exceed plus/minus 3 mm (1/8”) from design spacing. The cumulative error in spacing shall not exceed the requirements of the finishing materials.

.7 Erect track at head and sill of openings to accommodate intermediate studs. Secure track to studs at each end. Install intermediate studs above and below openings in same manner and spacing as wall studs.

.8 Align web cut outs in studs as required for the installation of through-the-knockout style bridging and services.

.9 Make field measurements necessary to insure the proper fit of all members.

.10 Cutting of members may be by saw or shear. Torch cutting is not permitted.

.11 Reinforce stud cut-outs where the distance from the centreline of the cut-out to the end of the member is less than 300 mm (12”).

.12 Replace members with localized damage.

.13 Unless a closer spacing is shown on the shop drawings, anchor top and bottom tracks securely to structure at 800 mm (32”) o.c. maximum. Place one additional anchor within

100 mm (4") of the end of each piece of track and additionally as required by the shop drawings.

.14 Install additional studs at abutting walls, openings, terminations against other materials and on each side at corners unless explicitly detailed otherwise on the shop drawings.

3.4 gypsum board

.1 Install sheathing in accordance with manufacturer's instructions and applicable instructions in ASTM C1280.

.2 Use maximum lengths possible to minimize number of joints.

.3 Attach gypsum board to metal framing with screws spaced 200 mm (8") o.c. at perimeter where there are framing supports and 200 mm (8") o.c. along intermediate framing in field.

.4 Drive fasteners to bear tight against and flush with surface of panels. Do not countersink.

.5 Locate fasteners minimum 10 mm (5/8") from edges and ends of panels.

3.5 Inspection

.1 Engage the engineer responsible for the engineering design of work of this Section to conduct periodic field review during construction and shall submit reports. These field reviews shall include review of mill tests reports, welded and screwed connections, connections to the main structure, member sizes, location and material thickness, coating thickness, erection tolerances, and all field cutting.

.2 The cost of this field review shall be paid for by the Contractor.

.3 Inspection shall include:

.1 Checking that mill test reports are properly correlated to materials.

.2 Sampling fabrication and erection procedures for general conformity to the requirements of the specification.

.3 Checking that the welding conforms to the requirements.

.4 Checking fabricated members against specified member geometries.

.5 Visual inspection of all welded connections including sample checking of joint preparation and fit-up.

.6 Sample checking of screwed and bolted joints.

.7 Sample checking that tolerances are not exceeded during fit-up or erection.

.8 Additional inspection and testing of welded connections as required by CSA W59.

.9 General inspection of field cutting and alterations required by other Sections.

.4 Submission of reports to the Contract Administrator, the Contractor and the authorities having jurisdiction covering the work inspected with details of deficiencies discovered.

.5 Provide necessary co-operation and access to insure that the inspection can proceed.

.6 The inspection provided in this Section does not relieve the Contractor of his responsibility for the performance of the contract. The Contractor is solely responsible for quality control and shall implement its own supervisory and quality control procedures.

.7 Materials or workmanship not conforming to the requirements of the Contract may be rejected at any time during the progress of work at no cost to the City even if the Contractor has to destroy and rebuild other work as a result.

.8 Any further testing or inspection because of non-compliance with requirements shall be paid for by the Contractor.

3.6 REPAIRS AND PROTECTION

.1 Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanizing repair paint in accordance with ASTM A780 and the manufacturer's instructions.

END OF SECTION