SECTION 05120 - STRUCTURAL STEEL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes structural steel

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section, “Quality Control,” for independent testing agency procedures and administrative requirements.
2. Division 3 Section, “Cast-in-Place Concrete,” for installing anchors set in concrete.
3. Division 4 Section, “Unit Masonry,” for installing anchors set in unit masonry.
4. Division 5 Section, “Metal Fabrications,” for loose, steel bearing plates and miscellaneous steel framing.
5. Division 9 Section, ‘Painting,” for surface preparation and prime painting.

C. Structural Performance: Design structural steel connections required by the Contract Documents to be selected or completed by the fabricator to withstand design loadings indicated in accordance with the, “Manual of Steel Construction," of the AISC.

D. Submittals: In addition to Product Data and mill test reports on structural steel and bolts, submit Shop Drawings detailing fabrication of structural steel components, including connections, splices, holes, welds, and bolts. **Contract Drawings in any form, shall not be submitted for shop drawings.**

E. Quality Assurance:

1. Installer Qualifications: Engage an experienced Installer who has completed structural steel work similar in material, design, and extent to that indicted for this Project and with a record of successful in-service performance. The Installer shall have an established quality assurance program. Documentation showing participation in the ”AISC Erector Certification Program” or another industry approved program shall be provided.
2. Fabricator Qualifications: Engage a firm experienced in fabricating structural steel similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to fabricate structural steel without delaying the Work. The Fabricator shall have an established quality assurance program. Documentation showing participation in the “AISC Fabricator Certification Program” or another industry approved program shall be provided.
3. Approved Fabricator: The fabricator shall be approved by the Building Official in accordance with Chapter 17 (Structural Tests and Special Inspections) of the International Building Code latest addition with any applicable local or state amendments. Submit Certificate of Compliance with this requirement to the Engineer and Special Inspector.

F. Comply with applicable provisions of the following specifications and documents:

1. AISC's, "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
2. ASTM A 6 (ASTM A 6M), "Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use."
3. Research Council on Structural Connections' (RCSC), "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

G. Welding Standards: Comply with applicable provisions of AWS D1.1, "Structural Welding Code--Steel."

1. Present evidence that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

H. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.

1. Store fasteners in a protected place. Clean and re-lubricate bolts and nuts that become dry or rusty before use.

1.3 PRODUCTS

A. Structural Steel Shapes, Plates, and Bars: ASTM A572, Grade 50 (wide flange shapes), all other shapes ASTM A 36 (ASTM A 36M), carbon steel.

B. Cold-Formed Structural Steel Tubing: ASTM A 500, Grade B.

C. Steel Pipe: ASTM A53 (Schedule 40, minimum).

D. Anchor Rods - ASTM F1554, Grade 36.

E. Anchor Bolts, Nuts, and Washers: ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); carbon-steel, hex-head bolts; carbon-steel nuts; and flat, unhardened steel washers, unbolted.

F. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers, unbolted.

G. Primer for Interior or Concealed Materials: Fabricator's standard lead- and chromate-free, non-asphaltic, rust-inhibiting primer. Primer shall be compatible with any field applied coatings, see Division 09. **Color shall match joists.**

H. Primer for Exterior Ferrous Metal: Two coats modified alkyd primer, Series FD88 Azeron Primer by Tnemec Company, Inc., light gray color, 2.0 to 3.5 mils DFT each, selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite

prolonged exposure.

I. Nonmetallic, Shrinkage-Resistant Grout: Premixed, ASTM C 1107, of consistency suitable for application.

J. Fabrication: Fabricate and assemble structural steel in shop to greatest extent possible. Fabricate structural steel according to AISC specifications referenced in this Section and in Shop Drawings.

1. Comply with fabrication tolerance limits of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel.
2. Shop install and tighten high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

a. Connection Type: Snug tightened, unless indicated as slip-critical, direct-tension, or tensioned shear/bearing connections.

3. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.

K. Shop Priming: Shop prime steel, except surfaces embedded in concrete or mortar, surfaces to be field welded, surfaces to be high-strength bolted with slip-critical connections, and surfaces to receive sprayed-on fireproofing.

1. Surface Preparation for Concealed Materials: SSPC-SP 3, "Power Tool Cleaning."
2. Surface Preparation Exterior Materials (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, “Commercial Blast Cleaning”.
3. Priming: Immediately after surface preparation, apply primer according to manufacturer's instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5-mils (0.038-mm) unless otherwise indicated. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
4. Touchup Painting: Cleaning and touchup painting of field welds, abraded area, and rust spots, as required after erection and before proceeding with field painting, are included in Division 09 Section, “Painting”.

1.4 EXECUTION

A. Erect structural steel accurately in locations and to elevations indicated and according to AISC specifications referenced in this Section. The contractor alone, shall be responsible for all errors of fabrication and for the correct fitting of all members.

B. Base and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates and set on wedges, shims, or setting nuts as required.

1. Tighten anchor bolts, cut off wedges or shims flush with edge of base or bearing plate, and pack grout solidly between bearing surfaces and plates.

C. Maintain erection tolerances of structural steel within AISC's, "Code of Standard Practice for Steel Buildings and Bridges."

D. Install and tighten high-strength bolts according to RCSC's, "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1. Connection Type: Snug tightened, unless indicated as slip-critical, direct-tension, or tensioned shear/bearing connections.

E. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.

F. Shop and Field Quality Control: Owner will engage an independent testing and inspecting agency to perform shop and field inspections and tests and to prepare test reports.

1. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.
2. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.
3. High-strength bolted connections will be tested and inspected according to RCSC's, "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
4. In addition to visual inspection, welded connections will be inspected and tested according to AWS D1.1 procedures.

END OF SECTION 05120

SECTION 05210 - STEEL JOISTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. K-series open-web steel joists.
2. KCS-series open-web steel joists, if shown on plan.
3. LH/DLH-series open-web steel joists, if shown on plan.
4. Joist girders, if shown on plan.
5. Joist accessories.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section, "Quality Control," for independent testing agency procedures and administrative requirements.
2. Division 3 Section, "Cast-in-Place Concrete," for installing anchors set in concrete.
3. Division 4 Section, "Unit Masonry," for installing anchors set in unit masonry.
4. Division 5 Section, "Structural Steel," for field quality-control procedures and tests.
5. Division 5 Section, "Metal Fabrications," for loose, steel bearing plates and miscellaneous steel framing.
6. Division 9 Section, "Painting," for surface preparation and prime painting.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Engineer, fabricate, and erect joists and connections to withstand design loads within limits and under conditions required.

1. Design Loads: As indicated.

B. Engineering Responsibility: Engage a joist manufacturer who utilizes a qualified professional engineer to prepare design calculations, shop drawings, and other structural data for steel joists.

C. Approved Fabricator: The fabricator shall be approved by the Building Official in accordance with Chapter 17 (Structural Tests and Special Inspections) of the International Building Codes' latest addition with any applicable local or state amendments. Submit Certificate of Compliance with this requirement to the Engineer and Special Inspector.

1.4 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each type of joist, accessory, and product specified.

C. Shop Drawings showing layout, mark, number, type, location, and spacing of joists. Include joining and anchorage details, bracing, bridging, accessories, splice and connection details, and attachments to other units of Work.

1. Indicate locations and details of anchorage devices and bearing plates to be embedded in other construction.
2. For LH/DLH–series joists and joists girders, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Material certificates signed by joist manufacturer certifying that joists comply with SJI's, "Specifications."

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Engage a firm experienced in manufacturing joists similar to those indicated for this Project and that have a record of successful in-service performance.

1. Manufacturer must be certified by SJI to manufacture joists conforming to SJI standard specifications and load tables.

B. SJI Design Standard: Comply with recommendations of SJI's, "Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders," applicable to types of joists indicated.

C. Welding Standards: Comply with applicable provisions of AWS D1.1, "Structural Welding Code--Steel" and AWS D1.3 "Structural Welding Code--Sheet Steel."

D. Professional Engineer Qualifications: A professional engineer who is legally authorized to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of joists that are similar to those indicated for this Project in material, design, and extent.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle joists as recommended in SJI's, "Specifications."

B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel: Comply with requirements of SJI's, "Specifications" for chord and web section material.

B. High-Strength Bolts and Nuts: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers.

1. Finish: Plain, non-coated.

C. Welding Electrodes: Comply with AWS standards.

2.2 PRIMERS

A. Primer: SSPC-Paint 15, Type I, gray oxide; Federal Specification TT-P-636, gray oxide; or manufacturer's standard shop primer meeting the performance requirements of either of these gray oxide primers. Primer shall be compatible with field applied coatings, see Division 09.

2.3 STEEL JOISTS

A. Manufacture joists according to SJI's, "Specifications," with steel angle top and bottom chord members, of joist types, end arrangements, and top chord arrangements indicated.

B. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.

C. Provide holes in chord members where shown for securing other work to steel joists.

D. Extend bearing ends of joists with SJI Type R extended ends where indicated, complying with SJI's, "Specifications" and load tables.

E. Camber joists according to SJI's, "Specifications."

F. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes when joist slope exceeds ¼-inch in 12-inches (1:48).

2.4 JOIST ACCESSORIES

A. Bridging: Fabricate bridging as indicated and according to SJI requirements.

1. Supply additional bridging to ensure stability of structure during construction period.

B. Supply ceiling extensions, either extended bottom chord elements or a separate extension unit of sufficient strength to support ceiling construction where ceilings occur. Extend ends to within ½ - inch (13-mm) of finished wall surface, unless otherwise indicated.

C. Supply miscellaneous accessories, including splice plates and bolts required by the joist manufacturer to complete the joist installation.

2.5 SHOP PAINTING

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories to be primed as follows:

1. Surface Preparation: Either hand tool cleaning, SSPC-SP 2, or power tool cleaning, SSPC-SP 3.

B. Apply one shop coat of primer to joists and joist accessories to be primed to provide a continuous, dry paint film thickness of not less than one (1)-mil (0.025-mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates, embedded bearing plates, and abutting structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of joists. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Do not install joists until supporting construction is in place and secured.

B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's, "Specifications," joist manufacturer's recommendations, and the requirements of this Section.

1. Before installation, splice joists delivered to Project site in more than one piece.
2. Space, adjust, and align joists accurately in location before permanently fastening.
3. Install temporary bracing and bridging, connections, and anchors to ensure joists are stabilized during construction.

C. Field weld joists to supporting steel framework and steel bearing plates. Coordinate welding sequence and procedure with placing of joists.

1. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

D. Bolt joists to supporting steel framework using high-strength structural bolts, unless otherwise indicated.

1. Comply with the Research Council on Structural Connections' (RCSC), "Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts," for high-strength structural bolt installation and tightening requirements.

E. Install and connect bridging concurrently with joist erection, before construction loads are applied.

Anchor ends of bridging lines at top and bottom chords where terminating at walls or beams.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: A qualified independent testing agency employed by the Owner will perform field quality-control testing.

B. Testing agency will report test results promptly and in writing to Contractor and Engineer.

C. Testing and verification procedures will be required of high-strength bolted connections and field welds.

1. High-strength, field-bolted connections will be tested and verified according to procedures in RCSC's, "Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts."
2. Field welds will be visually inspected.

D. Correct deficiencies in Work that inspections and test reports have indicated are not in compliance with specified requirements.

E. Additional testing will be performed to determine compliance of corrected Work with specified requirements.

3.4 REPAIRS AND PROTECTION

A. Touch-Up Painting: Following installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists, accessories, bearing plates, and abutting structural steel.

1. Clean and prepare surfaces by hand tool cleaning, SSPC-SP 2, or power tool cleaning, SSPC-SP 3.
2. Apply a compatible primer of the same type as the shop primer used on adjacent surfaces.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that joists and accessories are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 05210

SECTION 05310 – STEEL DECK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

1.2 GENERAL

A. Submittals: Product data and manufacturer's certificates for each type of deck and accessory and the following:

1. Shop drawings showing layout and types of deck panels, anchorage details, reinforcing channels, pans, deck openings, special jointing, accessories, and attachments to other units of Work.

B. Welding Standards: Comply with applicable provisions of AWS D1.1, "Structural Welding Code--Steel" and AWS D1.3, "Structural Welding Code--Sheet Steel," including welder certification.

C. FM Listing: Provide steel roof deck evaluated by Factory Mutual and listed in Factory Mutual "Approval Guide" for Class 1 fire rating and Class I-90 windstorm ratings. (Class 1-105 Windstorm Rating is required where drawings indicate ultimate wind speeds equal to or greater than 150-mph.)

1.3 PRODUCTS

A. Steel Roof Deck: Fabricate panels without top-flange stiffening grooves conforming to SDI Publication No. 28 "Specifications and Commentary for Steel Roof Deck" and the following:

1. Prime-Painted Steel Sheet: ASTM A 611, Grade E (80 ksi), shop primed. Primer shall be suitable for field applied coatings, see Division 09.
2. Deck Profile: As indicated on drawings.
3. Profile Depth: As indicated on drawings.
4. Design Uncoated-Steel Thickness: As indicated on drawings

B. Non-composite Steel Form Deck (if shown on plan): Fabricate ribbed-steel non-composite form deck panels conforming to SDI Publication No. 28, “Specifications and Commentary for Non-composite Steel Form Deck,” the minimum section properties indicated, and the following:

1. Galvanized-Steel Sheet: ASTM A 446, Grade E, G 60 (ASTM A 446M, Grade E, Z 180) zinc coated according to ASTM A 525 (ASTM A 525M).
2. Profile Depth: 9/16-inch (14 mm).
3. Design Uncoated-Steel Thickness: As indicated on drawings.

C. Accessories: Roof deck and form deck accessory materials and closures that comply with requirements indicated and recommendations of the steel deck manufacturer.

1.4 EXECUTION

A. Install deck panels and accessories according to applicable specifications and commentary of SDI Publication No. 28, manufacturer's recommendations, and requirements of this Section.

B. Place deck panels on supporting framing and adjust to final position with ends accurately aligned and bearing on supporting framing before being permanently fastened. Do not stretch or contract side lap interlocks.

C. Place deck panels flat and square and fasten to supporting framing without warp or deflection.

D. Cut, reinforce, and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to the decking.

E. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work.

F. Roof Deck Accessories: Install sump pans, sump plates, ridge and valley plates, finish strips, cover plates, end closures, and reinforcing channels according to deck manufacturer's recommendations. Weld to substrate to provide a complete deck installation.

G. Floor Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations, unless otherwise indicated.

H. Floor Deck Closures: Weld steel sheet closures according to SDI recommendations to provide tight-fitting closures at open ends of ribs and sides of decking. Weld cover plates at changes in direction of floor deck panels, unless otherwise indicated.

I. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces with galvanized repair paint according to ASTM A 780 and the manufacturer’s instructions.

J. Touchup Painting: Cleaning and touchup painting of field welds, abraded areas, and rust spots, as required after erection and before proceeding with field painting, are included in Division 9 Section, "Painting."

K. Field Quality Control: Roof deck placement and all roof deck welds shall be inspected, by an independent testing laboratory provided and paid for by the Owner for proper installation. The results of the inspection shall be sent to the Engineer for his records. Any welds found to be unacceptable shall be repaired and retested at the Contractor’s expense.

END OF SECTION 05310

SECTION 05400 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Structural engineering services provided by the cold-formed metal framing fabricator.
2. Exterior and interior load-bearing stud framed walls.
3. Exterior and interior nonload-bearing stud framed walls.
4. Steel joists and rafters.
5. Steel trusses.
6. Connections of light gage metal components to each other, and to their supports, are included in this Section.

B. Products Supplied But Not Installed Under This Section:

1. Anchor bolts.

C. Products Installed But Not Supplied Under This Section:

1. Insulation in inaccessible framing spaces.

1.3 PERFORMANCE REQUIREMENTS

A. Design Requirements:

1. Structural Design: Prepare complete structural design calculations for framing members and accessories by qualified Professional Engineer.
2. Design system to accommodate ¾ inch (19 mm) vertical deflection of structural building frame, live loading, seasonal and day/night temperature ranges, and construction tolerances.

B. Performance Requirements:

1. Performance:
   a. Design wind loads shall be in accordance with the current edition of the appropriate Building Code and local governing agencies.
   b. Wind load pressures shall be scaled in accordance with the height of the structure, multiplied by all applicable shape factors- These pressures shall be based on the requirements of the appropriate Building Code, latest edition.
2. Size Components to withstand design loads as shown on Drawings, and following deflection limits:
   a. Exterior Load-Bearing Walls: horizontal deflection of 1/240 of wall height for non-masonry walls or 1/600 for masonry walls, per applicable building code.

b. Interior Load-Bearing Walls: horizontal deflection of 1/240 of wall height as noted in applicable building code.
c. Floor Joists or Trusses: Vertical deflection of 1/240 of joist span for non-plaster ceilings or 1/360 for plaster ceilings, per applicable building code.
d. Roof Trusses: Vertical deflection of 1/360 of joist span.

3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connections failure, undue strain on fasteners sand anchors, or other detrimental effects when subjected to a maximum ambient temperature change of 120 deg F (67 deg C).

1.4 SUBMITTALS

A. Reference Division 1 Section "Submittal Procedures"; submit following items:

1. Submit manufacturer's product information and installation instructions for each item of light-gage framing and accessories.
2. Shop Drawings: Provide Shop Drawings prepared by cold-formed metal framing manufacturer. Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, open framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
   a. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer registered in the appropriate state who was responsible for their preparation.
3. Quality Assurance/Control Submittals:
   a. Qualifications: Proof of manufacturer, installer, and welder qualifications
   b. Structural Design Calculations
   c. Certificates:
      1) Mill Certificates, independent laboratory test or in-house testing with calibrated test equipment per ICC AC46 Acceptance Criteria for Cold-Formed Steel Framing Members, certifying compliance with material requirements, including uncoated steel thickness, yield strength, total elongation, and galvanized coating thickness.
      2) Welder Certificates
   d. Manufacturer's Installation Instructions for framing members and framing accessories.

B. Closeout Submittals: Reference Division 1 Section "Closeout Procedures"; submit the following items:

1. Record Drawings.

1.5 QUALITY ASSURANCE

A. Overall Standards:

1. Calculate structural properties of cold-formed metal framing and accessories in accordance with AISI "North American Specification for the Design of Cold-Formed Steel Structural Members".
2. Provide structural design calculations sealed and signed by a Professional Engineer licensed in the state where the Project is located.
3. Welding Standards: Comply with AWS DI 1 "Structural Welding Code-Steel", and AWS DI 3 "Structural Welding Code-Steel".

4. Mill certificates independent laboratory test or in-house testing with calibrated test equipment per ICC AC46 Acceptance Criteria for Cold-Formed Steel Framing Members, indicating steel sheet complies with requirements, including uncoated steel thickness, yield strength, tensile strength, total elongation, chemical requirements, and galvanized-coated thickness.
5. Fire-Test-Response Characteristics: Where metal framing is part of a fire resistance-rated assembly, provide framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction. Products used in the assembly shall carry a classification label from a testing laboratory acceptable to authority having jurisdiction.
    a. Fire-Resistance Ratings: As indicated by design designations listed in UL "Fire Resistance Directory", or by Warnock Hersey or another testing and inspecting agency acceptable to authorities having jurisdiction.

B. Qualifications:

1. Manufacturers' Qualifications: Minimum five years' experience in producing products of the type specified.
2. Installer Qualifications: Minimum three years' experience in installation of the type of products specified.
3. Welder Qualifications: Current AWS Certificates for welding processes required.

C. Pre-Installation Meeting:

1. Convene meeting at project site within one week of scheduled start of installation with representatives of the following in attendance: Owner, Architect, General Contractor, and metal framing Sub-Contractor.
2. Review substrate conditions, requirements of related work, installation instructions, storage and handling procedures, and protection measures.
3. Keep minutes of meeting including responsibilities of various parties and deviations from specifications and installation instructions; distribute minutes to attendees within 72 hours.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect and store cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling in accordance with AISI's "Code of Standard Practice"- Store cold-formed metal framing off the ground, protect with a waterproof covering, and ventilate to avoid condensation. Deliver to the project site in manufacturer's unopened containers or bundles, fully identified with name, brand, type, and grade.

B. Follow manufacturer's instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Studs, Tracks, Joists, Trusses: Any manufacturer complying with requirements specified herein, including but not limited to the following:

1. ClarkDietrich Building Systems; Website: www.clarkdietrich.com.
2. CONFAB, Consolidated Fabricators Corp.; Website: www.con-fab.com.
3. Design Shapes in Steel; Phone: 626.579.2032.

4. Marino/WARE; Website: www.marinoware.com.
5. Studco Building Systems' Website: www.studcosystems.
6. Super Stud Building Products, Inc.; Website: www.buysuperstud.com.

B. Framing Accessories: Subject to compliance with requirements, provide framing accessories by one of the following:

1. The Steel Network, Inc. (TSN); Website: www.steelnetwork.com.
2. ClarkDietrich Building Systems; Website: www.clarkdietrich.com.

C. With each type of metal framing required, provide manufacturer's standard steel runners (tracks), blocking, lintels, clip angles, shoes, reinforcements, fasteners and accessories as recommended by the manufacturer for applications indicated, as needed to provide a complete metal framing system.

D. Substitutions: None allowed.

2.2 FRAMING MEMBERS

A. Studs: ASTM A1003/1003M, A 653/653 M steel, G60 (ZI80) or G90 (Z275) galvanized as noted on Drawings, channel shaped with lipped flanges, punched web, size as shown on Drawings, thickness and grade as required by structural design calculations.

B. Tracks: ASTM A1003/1003M, A 653/653 M steel, same designation, coating, and thickness as studs except as otherwise noted, channel shaped, solid web, depth compatible with studs, size, thickness and grade as required by structural design calculations.

C. Deflection Track Slotted: Manufacturer's single, deep-leg, U-shaped steel track: punched with vertical slots in both legs. Steel Sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

1. Subject to compliance with requirements, provide: ClarkDietrich Building Systems, SLP-TRK® Slotted Deflection Track by Brady Innovations or equivalent.

D. Headers and Jambs: Manufacturer's proprietary shape used to form header beams and jambs, columns or posts, of web depths indicated, un-punched, with stiffened flanges and as follows:

1. Subject to compliance with requirements, provide one of the following:
   a. ClarkDietrich Building Systems: Heavy Duty Studs – HDS and Header Bracket – HDSC; Website: www.clarkdietrich.com.
   b. Brady Construction Innovations, Inc.; ProX Header®; Website: www.proxheader.com .

E. Joists and Rafters: ASTM A1003/100/3M, A 653/653 M steel, G60 (ZI80) or G90 (Z275) galvanized as noted on Drawings, channel shaped with lipped flanges, solid web, size as shown on Drawings, thickness and grade as required by structural design calculations.

F. Trusses: ASTM A1003/1003M, A 653/653M steel, G60 (ZI80) or G90 (Z275) galvanized as noted on Drawings. Provide manufacturer's standard chord and web member profiles with mechanical properties as required by structural design calculations shop fabrication required.

1. Design trusses in accordance with AISI "Design Guide for Cold-Formed Steel Trusses, Publication RG-95 18".

2. Determine mechanical properties by testing in accordance with ASTM A 370.
3. Configure web members as required by structural design calculations.

2.3 FRAMING ACCESSORIES

A. Material: ASTM A 653 (653M) steel; SS Grade 50 (340), Class 1, 50ksi (340 MPa) minimum yield strength, 65 ksi (450 MPa) minimum tensile strength, G60 (Z180) hot dipped galvanized coating, except as otherwise noted.

B. Stamp manufacturer's name on each accessory item.

C. Provide screws with accessories designated for screw attachment.

D. Connector Devices:

1. Vertical Deflection Clips: VertiClip®, ClarkDietrich Building Systems: Fast Strut™ / Fast Top™ Clips / FastClip™ Slide Clips / Quick Clips™ / SlideClip™ (SD) including step bushings. Rigid attachment to structure and screw attachment to stud web using step-bushings to permit frictionless vertical movement. 68 mils (1.72 mm) minimum thickness, size as required by structural design calculations.
2. Drift System Clips: DriftClip™, including step bushings. 68 mils (1.72 mm) minimum thickness, size as required by structural design calculations.
   a. Screw attachment to stud web using step-bushings to permit frictionless vertical movement.
   b. Screw attachment to structure using step-bushings to permit frictionless movement in the plane of the wall.
3. Rigid Clip Angles: StiffClip™; ClarkDietrich Building Systems: EasyClip™ or UniClip™- Rigid attachment to structure and stud web.
4. Floor Ties: Floor to floor strap ties, 2 inches (50 mm) by 54 mils (1.37 mm) thick. Screw attachment to stud flanges. Length as required by structural design calculations.
5. Hip Angle–135 degree: Rigid attachment to webs of hip framing members. Length and thickness as required by structural design calculations.
6. Roof Ties: Fabricate for screw attachment to joist web and top track/stud flanges. Size and thickness as required by structural design calculations.

E. Bridging:

1. Cold Formed-Channel: 1-1/2 by 1/2 inch by 56 mil thick (38 by 13 by 1.42 mm).
   a. Bridging Clip: BridgeClip, ClarkDietrich Building Systems, EasyClip™ U-Series or X-series - Provide attachment through stud punch-out clamping onto stud web and wrapping around bridging channel. Provide holes for screw attachment to stud web and channel.
2. Flat Strap. Width and thickness as required by structural design calculations. Rigid attachment to stud flange.
3. Solid Bridging: Channel shaped bridging with lipped flanges and integral formed clips. Screw attachment to stud. 33 mils (0.84 mm) minimum thickness, size as required by structural design calculations.
   a. Subject to compliance with requirements, provide one of the following:
      1) ClarkDietrich Building Systems: Spazzer® 5400 Bridging and Bracing Bar (SPZS) Spazzer® Bar Guard (SPBG)].
      2) U-Channel Assembly: 3/4 inches, 1-1/2 inches, 2 inches
         a) ClarkDietrich Building Systems: EasyClip™ U-Series™ Clip Angle or equivalent.

4. Cross Bridging: Fabricate members for specific joist depth and spacing with one screw to each joist flange and one to each joist web. Provide bridging sized to joist depth and spacing, 36 mils (0.91 mm) minimum thickness, as required by structural design calculations.

F. Miscellaneous Items:

1. Joist Hangers: Rigid attachment to structure and joist web, 68 mils (1.72 mm) thick. Provide hanger type and size as required by structural design calculations.
2. Joist Plate: Hole reinforcing plates designed for screw attachment to joist or stud webs. Provide size and thickness as required by structural design calculations.
3. Web Stiffeners: Channel shaped stiffener. Screw attachment to joist or stud webs. Provide size and thickness as required by structural design calculations.
   a. Subject to compliance with requirements, provide ClarkDietrich Building Systems; Easy Clip™ Quick Twist Web Stiffeners.

2.4 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts headless, hooked bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.

D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.

1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

F. Welding Electrodes: Comply with AWS standards.

2.5 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Compound: SSPC-Paint 20, spray-can applicator.

B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and a 30-minute working time.

2.6 FABRICATION

A. Fabricate cold-formed metal framing and accessories plumb, square, true to line, and with connections securely fastened, according to manufacturer's recommendations and the requirements of this Section.

1. Fabricate framing assemblies in jig templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
   a. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
   b. Locate mechanical fasteners and install according to cold-framed metal framing manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or distortion.

C. Fabrication Tolerances: Fabricate assemblies to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

2.7 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035 ASTM A 780.

B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

C. Shims: Load bearing, high-density multimonomer plastic, nonleaching.

D. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates upon which work will be installed.

B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.

C. Commencement of work by installer is acceptance of substrate.

D. Grout bearing surfaces uniform and level to ensure full contact of bearing flanges or track webs on supporting concrete or masonry construction.

3.2 GENERAL INSTALLATION

A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed metal framing according to ASTM C 1007, unless more stringent requirements are indicated.

C. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to manufacturer's written recommendations and requirements in this Section.

1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
   a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
   b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.

D. Install framing members in one-piece lengths, unless splice connections are indicated for track or tension members.

E. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

F. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.

G. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.

H. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.3 FRAMING MEMBER INSTALLATION

A. Studs:

1. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated. Squarely seat studs against webs of top and bottom tracks. Fasten both flanges of studs to top and bottom track, unless otherwise indicated. Space studs 16 inches unless noted otherwise on the Drawings.

2. Install studs at spacing as shown on Drawings or as required by structural design calculations, at each side of openings, and not more than 2 inches (50 mm) from abutting walls.
   a. Frame corners with three studs.
   b. Frame wall openings wider than stud spacing with double stud at each jamb.
3. Set studs plumb except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
4. Isolate steel framing from building structure at locations indicated to prevent transfer of vertical loads while providing lateral support.
   a. Install “deep leg” deflection track and anchor to building structure.
   b. Connect studs with vertical slide clips to continuous angles or supplementary framing anchored to building structure.
5. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable framing system.

B. Joist Installation:

1. Install joists at spacing as shown on Drawings or required by structural design calculations, and not more than 2 inches (50 mm) from abutting walls.
2. Locate end bearing directly over load bearing studs or provide load-distributing member as required by structural design calculations.

C. Rafter Installation:

1. Install rafters at spacing as shown on Drawings or required by structural design calculations.
2. Locate end bearing directly over load bearing studs or provide load-distributing member as required by structural design calculations.

D. Truss Installation:

1. Install trusses at spacing as shown on Drawings or required by structural design calculations.
2. Locate end bearing directly over load bearing studs or provide load-distributing member as required by structural design calculations.
3. Do not remove, cut, or otherwise alter truss members or connections.
4. Install, bridge, and brace trusses according to Shop Drawings and requirements in this Section.
5. Erect trusses with plane of truss webs plumb and parallel to each other, align, and accurately position at spacings indicated.
6. Erect trusses without damaging framing members or connections.
7. Install continuous bridging and permanently brace trusses as indicated on Shop Drawings.

3.4 FRAMING ACCESSORY INSTALLATION

A. Install accessories as required by structural design calculations. Provide appropriate fasteners in all predrilled holes backed by another framing member.

1. For Partitions, Bridging Clip; ClarkDietrich Building Systems: EasyClip™ U-Series or X-Series for Cold Formed- Channel Bridging: Secure to stud web by inserting tabs through web slots. Secure to channel with one screw.
2. For Load Bearing Walls, Bridging Clip, ClarkDietrich Building Systems: EasyClip™ U-Series or X-Series for Cold Formed Channel Bridging: Secure to stud web by inserting tabs through web slots and with 2 screws. Secure to channel with one screw.

3.5 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing agency to perform filed quality-control testing.

B. Testing: Field and shop welds are subject to testing by an independent testing agency in accordance with Division 1 Section “Quality Control”.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Remove and Replace work that does not comply with specified requirements.

E. Additional testing and inspecting, at Contractor’s expense, will be performed at determine compliance of corrected work with specified requirements.

3.6 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and install cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer’s written instructions.

B. Touchup Painting: Wire brush, clean, and paint scarred areas, welds, and rust spots on fabricated and installed prime-painted, cold-formed metal framing. Paint framing surfaces with same type of shop paint used on adjacent surfaces.

C. Protect paper-surfaced gypsum sheathing that will be exposed to weather for more than 30 days by covering exposed exterior surface of sheathing with a securely fastened air-infiltration barrier. Apply covering immediately after sheathing is installed.

D. Protect cutouts, corners, and joints in sheathing by filling with a flexible sealant or by applying tape recommended by sheathing manufacturer at time sheathing is applied.

E. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer that ensure cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05400

Issue Date: 08-23-16

SECTION 05500 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Miscellaneous steel framing and supports.
2. Shelf angles.
3. Loose bearing and leveling plates.
4. Steel weld plates and angles.
5. Miscellaneous steel trim.
6. Column protection covers.
7. Loose steel lintels.
8. Stainless steel cart rails.
9. Corner guards.
10. Case guard bollards.

1.3 SUBMITTALS

A. Shop Drawings: Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

B. Templates: For anchors and bolts.

PART 2 - PRODUCTS

2.1 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces without blemishes.

B. Ferrous Metals:

1. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
2. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.
3. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
4. Rolled-Stainless-Steel Floor Plate: ASTM A 793.
5. Steel Tubing: ASTM A 500, cold-formed steel tubing.

6. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
7. Slotted Channel Framing: Cold-formed metal channels complying with MFMA-3, 1-5/8 by 1-5/8 inches. Channels made from galvanized steel complying with ASTM A 653/A 653M, structural steel, Grade 33, with G90 coating; 0.079-inch nominal thickness.
8. Cast Iron: ASTM A 48/A 48M, Class 30, unless another class is indicated or required by structural loads.

C. Nonferrous Metals:

1. Aluminum Extrusions: ASTM B 221, alloy 6063-T6.
2. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, alloy 6061-T6.
3. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

2.2 FASTENERS

A. General: Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.

B. Cast-in-Place Anchors in Concrete: Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.

2.3 MISCELLANEOUS MATERIALS

A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI #79.

B. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.

1. Products:
   a. Benjamin Moore & Co.; Epoxy Zinc-Rich Primer CM18/19.
   b. ICI Devoe Coatings; Catha-Coat 313.
   c. International Coatings Limited; Interzinc 315 Epoxy Zinc-Rich Primer.
   d. PPG Architectural Finishes, Inc.; Aquapon Zinc-Rich Primer 97-670.
   e. Sherwin-Williams Company (The); Corothane I GalvaPac Zinc Primer.
   f. Tnemec Company, Inc.; Tneme-Zinc 90-97.

C. Galvanizing Repair Paint: SSPC-Paint 20, high-zinc-dust-content paint for regalvanizing welds in steel.

D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107.

E. Concrete Materials and Properties: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.

2.4 FABRICATION

A. General: Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces.

1. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.
2. Weld corners and seams continuously. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. Obtain fusion without undercut or overlap. Remove welding flux immediately. Finish exposed welds smooth and blended.
3. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Locate joints where least conspicuous.
4. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
5. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, not less than 24 inches o.c.

B. Miscellaneous Framing and Supports: Provide steel framing and supports not specified in other Sections as needed to complete the Work. Fabricate units from steel shapes, plates, and bars of welded construction. Cut, drill, and tap units to receive hardware, hangers, and similar items.

1. Fabricate steel girders for wood frame construction from continuous steel shapes. Where wood nailers are attached to girders with bolts or lag screws, drill holes at 24 inches o.c.
2. Fabricate steel pipe columns for supporting wood frame construction with steel baseplates and top plates welded to pipe with fillet welds the same size as pipe wall thickness.

C. Loose Steel Lintels: Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.

1. Lintels in Exterior Walls: Galvanize, Prime with zinc-rich primer.

D. Shelf Angles: Fabricate shelf angles of sizes indicated and for attachment to framing. Fabricate with horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches o.c.

1. Shelf Angles in Exterior Walls: Galvanize.
2. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

E. Loose Bearing and Leveling Plates: Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts.

F. Miscellaneous Steel Trim: Fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.

1. Exterior Miscellaneous Steel Trim: Painted.

G. Stainless Steel Cart Rail and Enclosure: Purchase from HT approved manufacturer.

1. Refer to Harris Teeter National Account Contact List.

H. Corner Guard: Provide for minimum 0.059-inch AISI type 304 stainless steel sheet. Provide 90degree corners, unless otherwise indicated. All edges shall be depressed smooth.

1. Size: 2 ½ inches by 2 ½ inches by height indicated.
2. Mounting method: double faced self-adhesive foam tape.
3. Corner Radius: 1/8-inch.

I. Case guard bollards: 1-5/8 inches diameter SS pipe bollards; Model # CGT 245 with IFS sleeve as manufactured by M&E Manufacturing Co., Inc., Kingston, NY; Phone: (800) 431 6065.

2.5 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Finish metal fabrications after assembly.

B. Steel and Iron Finishes:

1. Hot-dip galvanize items as indicated to comply with ASTM A 123/A 123M or ASTM A 153/A 153M as applicable.
2. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with requirements indicated below for environmental exposure conditions of installed metal fabrications:
   a. Exteriors (SSPC Zone 1B) and Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
   b. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."
3. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting," for shop painting.
4. Stainless Steel: Remove tool and die marks, stretch lines or blend into finish. When polishing is complete, passivate and rinse surface to remove embedded matter.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, with edges and surfaces level, plumb, and true.

1. Fit exposed connections accurately together. Weld connections that are not to be left as exposed joints but cannot be shop welded. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication.
2. Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction.
3. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

B. Set bearing and leveling plates on cleaned surfaces using wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts and pack solidly with nonshrink, nonmetallic grout.

C. Column protection covers: Install column covers with stainless steel pop rivets at 8 inches o.c. Turn lap joints towards nearest shelving or to rear of sales floor on exposed columns. All joints shall be smooth and free of projections.

D. Stainless Steel Cart Rail and Enclosure: Verify field conditions and measurements and mark up shop drawings provided by manufacturer. Install per the manufacturer’s recommendations.

E. Corner Guards: Install corner guards plumb, tight to substrate, level and true to line without distortions. Seal all edges with sealant as specified in Division 7 Section "Joint Sea1ants."

F. Case Guard Bollards: Install case guard bollards in accordance with the manufacturer’s written instructions.

G. Touch up surfaces and finishes after erection.

1. Painted Surfaces: Clean field welds, bolted connections, and abraded areas and touch up paint with the same material as used for shop painting.
2. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 05500

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