1 GENERAL

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.

2. SUMMARY

a. Section includes architecturally exposed structural-steel framing.

1) Requirements in Division 5 Section "Structural Steel" also apply to AESS framing.

b. Related Sections:

1) Division 1 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
2) Division 5 Section "Structural Steel" for additional requirements applicable to AESS.
3) Division 5 Section "Metal Fabrications" for other metal items not defined as structural steel.
4) Division 5 Section "Metal Stairs."
5) Division 9 Section "High-Performance Coatings" for surface preparation and priming requirements.

3. DEFINITIONS

a. Architecturally Exposed Structural Steel: Structural steel designated as "architecturally exposed structural steel" or "AESS" in the Contract Documents.

4. ACTION SUBMITTALS

a. Shop Drawings: Show fabrication of AESS components.

1) Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2) Include embedment drawings.
3) Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain. Indicate grinding, finish, and profile of welds.

4) Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections. Indicate orientation of bolt heads.
5) Indicate exposed surfaces and edges and surface preparation being used.
6) Indicate special tolerances and erection requirements.

5. INFORMATIONAL SUBMITTALS

a. Qualification Data: For qualified fabricator.

6. QUALITY ASSURANCE

a. Mockups: Build mockups of AESS to set quality standards for fabrication and installation.

1) Build mockup of typical portion of AESS as shown on Drawings.
2) Coordinate finish painting requirements with Division 9 painting Sections.
3) Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

7. DELIVERY, STORAGE, AND HANDLING

a. Use special care in handling to prevent twisting, warping, nicking, and other damage. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1) Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

8. PROJECT CONDITIONS

a. Field Measurements: Where AESS is indicated to fit against other construction, verify actual dimensions by field measurements before fabrication.

9. COORDINATION

a. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.

2 PRODUCTS

1. BOLTS, CONNECTORS, AND ANCHORS

a. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, round-head assemblies, consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.

1) Finish: Mechanically deposited zinc coating.

b. Corrosion-Resisting (Weathering Steel), Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 3, round-head assemblies, consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.

2. PRIMER

a. Primer: Comply with Division 9 painting Sections and Division 9 Section "High-Performance Coatings."

b. Etching Cleaner for Galvanized Metal: Complying with MPI#25.

c. Galvanizing Repair Paint: ASTM A 780.

3. FABRICATION

a. Shop fabricate and assemble AESS to the maximum extent possible. Locate field joints at concealed locations if possible. Detail assemblies to minimize handling and to expedite erection.

b. In addition to special care used to handle and fabricate AESS, comply with the following:

1) Fabricate with exposed surfaces smooth, square, and free of surface blemishes including pitting, rust, scale, and roughness.
2) Grind sheared, punched, and flame-cut edges of AESS to remove burrs and provide smooth surfaces and edges.
3) Fabricate AESS with exposed surfaces free of mill marks, including rolled trade names and stamped or raised identification.
4) Fabricate AESS with exposed surfaces free of seams to maximum extent possible.
5) Remove blemishes by filling or grinding or by welding and grinding, before cleaning, treating, and shop priming.
6) Fabricate with piece marks fully hidden in the completed structure or made with media that permits full removal after erection.
7) Fabricate AESS to the tolerances specified in AISC 303 for steel that is designated AESS.
8) Fabricate AESS to the tolerances specified in AISC 303 for steel that is not designated AESS.
9) Seal-weld open ends of hollow structural sections with 3/8-inch (9.5-mm) closure plates for AESS.

c. Curved Members: Fabricate indicated members to curved shape by rolling to final shape in fabrication shop.

1) Distortion of webs, stems, outstanding flanges, and legs of angles shall not be visible from a distance of 20 feet (6 m) under any lighting conditions.
2) Tolerances for walls of hollow steel sections after rolling shall be approximately 1/2 inch (13 mm).

d. Coping, Blocking, and Joint Gaps: Maintain uniform gaps of 1/8 inch (3.2 mm) with a tolerance of 1/32 inch (0.8 mm) for AESS.

e. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.

f. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.

1) Cut, drill, or punch holes perpendicular to steel surfaces
2) Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3) Weld threaded nuts to framing and other specialty items indicated to receive other work.

4. SHOP CONNECTIONS

a. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
1) Provide continuous welds of uniform size and profile where AESS is welded.
2) Make butt and groove welds flush to adjacent surfaces within tolerance of plus 1/16 inch, minus 0 inch (plus 1.5 mm, minus 0 mm) for AESS. Do not grind unless required for clearances or for fitting other components, or unless directed to correct unacceptable work.
3) Remove backing bars or runoff tabs; back-gouge and grind steel smooth for AESS.
4) At locations where welding on the far side of an exposed connection of AESS occurs, grind distortions and marking of the steel to a smooth profile aligned with adjacent material.
5) Make fillet welds for AESS of uniform size and profile with exposed face smooth and slightly concave. Do not grind unless directed to correct unacceptable work.

5. SHOP PRIMING

a. Shop prime steel surfaces except the following:

1) Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
2) Surfaces to be field welded.
3) Surfaces to be high-strength bolted with slip-critical connections.
4) Surfaces to receive sprayed fire-resistive materials.

b. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1) SSPC-SP 2, "Hand Tool Cleaning."
2) SSPC-SP 3, "Power Tool Cleaning."
3) SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

c. Preparing Galvanized Steel for Shop Priming: After galvanizing, thoroughly clean steel of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.

d. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

3 EXECUTION

1. EXAMINATION

a. Verify, with steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1) Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

b. Examine AESS for twists, kinks, warping, gouges, and other imperfections before erecting.

c. Proceed with installation only after unsatisfactory conditions have been corrected.

2. PREPARATION

a. Provide temporary shores, guys, braces, and other supports during erection to keep AESS secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

1) If possible, locate welded tabs for attaching temporary bracing and safety cabling where they will be concealed from view in the completed Work.
2) Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3. ERECTION

a. Set AESS accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

b. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.

4. FIELD CONNECTIONS

a. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

b. Weld Connections: Comply with requirements in "Weld Connections" Paragraph in "Shop Connections" Article.

1) Remove backing bars or runoff tabs; back-gouge and grind steel smooth for AESS.
2) Remove erection bolts in AESS, fill holes, and grind smooth.
3) Fill weld access holes in AESS and grind smooth.

5. FIELD QUALITY CONTROL

a. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect AESS as specified in Division 5 Section "Structural Steel." The testing agency will not be responsible for enforcing requirements relating to aesthetic effect.

b. Architect will observe AESS in place to determine acceptability relating to aesthetic effect.

6. REPAIRS AND PROTECTION

a. Remove welded tabs that were used for attaching temporary bracing and safety cabling and that are exposed to view in the completed Work. Grind steel smooth.

b. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

c. Touchup Painting: Cleaning and touchup painting are specified in Division 9 painting Sections.

END OF SECTION 05121