SECTION 05500

METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated steel items.

1.02 RELATED REQUIREMENTS

A. Section 03300 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.

B. Section 04810 - Unit Masonry Assemblies: Placement of metal fabrications in masonry.

C. Section 09900 - Paints and Coatings: Paint finish.

1.03 REFERENCE STANDARDS

A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements.

B. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel.

C. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

D. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

E. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

F. ASTM A 283/A 283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.

G. ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

H. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

I. ASTM A 325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Tensile Strength (Metric).

J. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

K. ASTM A 501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

L. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

M. ASTM A 1011/A 1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.

N. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society.

O. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society.

P. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; American Welding Society.

Q. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings.

R. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings.

S. SSPC-SP 2 - Hand Tool Cleaning; Society for Protective Coatings.

1.04 SUBMITTALS

A. See Section 01350 - Submittals, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
   1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A 500, Grade B cold-formed or ASTM A 501 hot-formed structural tubing.

C. Plates: ASTM A 283.

D. Pipe: ASTM A 53/A 53M, Grade B Schedule 40, hot-dip galvanized finish.

E. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

F. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

G. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by continuous welds.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED ITEMS

A. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; galvanized finish.
   1. Side Rails: 3/8 x 2 inches members spaced at 20 inches.
   2. Rungs: one inch diameter solid round bar spaced 12 inches on center.
   3. Space rungs 7 inches from wall surface.
   4. Security Door (where indicated on drawings): Provide 6-foot high, 20 gage sheet metal door with one (1) pair hinges and lock hasp.

B. Bumper Posts: As detailed; galvanized finish.

C. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; galvanized finish.

D. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: As detailed.

E. Awnings: As detailed; galvanized finish.

F. Door Frames for Overhead Door Openings: Channel, and Angle sections; galvanized finish.

G. Elevator Hoistway Divider Beams: Beam sections; prime paint finish.

2.04 FINISHES - STEEL

A. Prime paint all steel items.
   1. Exceptions: Galvanize items to be embedded in concrete or masonry.
   2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

B. Prepare surfaces to be primed in accordance with SSPC-SP2.

C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

D. Prime Painting: Two coats.

E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A 123/A 123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.

F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A 123/A 123M requirements.

2.05 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components indicated on drawings.

D. Perform field welding in accordance with AWS D1.1/D1.1M.

E. Obtain approval prior to site cutting or making adjustments not scheduled.

F. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 05510

METAL STAIRS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Stairs with concrete treads.

B. Structural steel stair framing and supports.

C. Handrails and guards.

D. Structural design by a professional engineer.

1.02 RELATED REQUIREMENTS

A. Section 03300 - Cast-in-Place Concrete: Placement of metal anchors in concrete.

B. Section 09900 - Paints and Coatings: Paint finish.

1.03 REFERENCE STANDARDS

A. ASTM A 6/A 6M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.

B. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel.

C. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

D. ASTM A 283/A 283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.

E. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

F. ASTM A 325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Tensile Strength (Metric).

G. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

H. ASTM A 501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

I. ASTM A 786/A 786M - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.

J. ASTM A 1008/A 1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength, Low Alloy, and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

K. ASTM E 935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.

L. ASTM E 985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings.

M. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines.

N. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society.

O. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society.

P. NAAMM AMP 510 - Metal Stairs Manual; The National Association of Architectural Metal Manufacturers.

Q. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings.

R. SSPC-SP 2 - Hand Tool Cleaning; Society for Protective Coatings.

1.04 SUBMITTALS

A. See Section 01350 - Submittals, for submittal procedures.

B. Design: The Contractor must provide structural design by a professional engineer.

C. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
   1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
   2. Include the design engineer's stamp or seal on each sheet of shop drawings.

D. Delegated Design Data: As required by authorities having jurisdiction.

E. Welders' Certificates.

1.05 QUALITY ASSURANCE

A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the state of California, or personnel under direct supervision of such an engineer.

B. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Stair Fabricators:
   1. Alfab, Inc.: www.alfabinc.com.
   2. American Stair, Inc.: www.americanstair.com.
   3. Sharon Stairs: www.sharonstair.com.
   4. Substitutions: See Section 01640 - Product Requirements.

2.02 METAL STAIRS - GENERAL

A. Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.
   1. Regulatory Requirements: Provide stairs and railings complying with the most stringent requirements of local, state, and federal regulations; where requirements of the contract documents exceed those of regulations, comply with the contract documents.
   2. Structural Design: Provide complete stair and railing assemblies complying with the applicable local code.
   3. Dimensions: As indicated on drawings.
   4. Shop assemble components; disassemble into largest practical sections suitable for transport and access to site.
   5. No sharp or rough areas on exposed travel surfaces and surfaces accessible to touch.
   6. Separate dissimilar metals using paint or permanent tape.

B. Metal Jointing and Finish Quality Levels:
   1. Architectural: All joints as inconspicuous as possible, whether welded or mechanical.
      a. Welded Joints: Continuously welded and ground smooth and flush.
      b. Mechanical Joints: Butted tight, flush, and hairline; concealed fastenings only.

c. Exposed Edges and Corners: Eased to small uniform radius.
d. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for highest quality gloss finish.

C. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.

D. Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.

2.03 METAL STAIRS WITH CONCRETE TREADS

A. Jointing and Finish Quality Level: Architectural, as defined above.

B. Risers: Closed.

C. Treads: Metal pan with field-installed concrete fill.
1. Concrete Depth: 1-1/2 inches, minimum.
2. Tread Pan Material: Steel sheet.
3. Tread Pan Thickness: As required by design; 14 gage, 0.075 inch minimum.
4. Pan Anchorage to Stringers: Welded to carrier angles welded to stringers.
5. Concrete Reinforcement: None.
6. Concrete Finish: For resilient floor covering.

D. Risers: Same material and thickness as tread pans.
1. Riser/Nosing Profile: Sloped riser with rounded nosing of minimum radius.
2. Nosing Return: Flush with top of concrete fill, not more than 1/2 inch wide.

E. Stringers: Rolled steel channels.
1. Stringer Depth: 12 inches.
2. End Closure: Sheet steel of same thickness as risers welded across ends.

F. Landings: Same construction as treads, supported and reinforced as required to achieve design load capacity.

G. Landings: Similar construction, using corrugated steel decking, supported and reinforced as required to achieve design load capacity.

H. Railings: Steel pipe railings.

I. Finish: Shop- or factory-prime painted.

J. Under Side of Stair: Exposed to view, to be finished same as specified for other exposed to view surfaces.

2.04 HANDRAILS AND GUARDS

A. Wall-Mounted Rails: Round pipe or tube rails unless otherwise indicated.
1. Outside Diameter: 1-1/4 inch, minimum, to 1-1/2 inches, maximum.

B. Guards:
1. Top Rails: Round pipe or tube rails unless otherwise indicated.
   a. Outside Diameter: 1-1/4 inch, minimum, to 1-1/2 inches, maximum.
2. Infill at Picket Railings: Vertical pickets.
   a. Horizontal Spacing: Maximum 4 inches on center.
   b. Material: Solid steel bar.
   c. Shape: Round.
   d. Size: 1/4 inch diameter.
   e. Top Mounting: Welded to underside of top rail.
3. Infill at Pipe Railings: Pipe or tube rails sloped parallel to stair.
   a. Outside Diameter: 1 inch.
   b. Material: Steel pipe or tube, round.

c. Vertical Spacing: Maximum 4 inches on center.
d. Jointing: Welded and ground smooth and flush.

4. End and Intermediate Posts: Same material and size as top rails.
   a. Horizontal Spacing: As indicated on drawings.
   b. Mounting: Welded to top surface of stringer.

2.05 MATERIALS

A. Steel Sections: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A 500 or ASTM A 501 structural tubing, round and shapes as indicated.

C. Steel Plates: ASTM A 6/A 6M or ASTM A 283/A 283M.

D. Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.

E. Ungalvanized Steel Sheet: Hot- or cold-rolled, unless otherwise indicated.
   1. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Designation SS (structural), Grade 33.
   2. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Designation SS (structural), Grade 33, Type 1.

F. Concrete Fill: Portland cement Type I, 3000 psi 28 day strength, 2 to 3 inch slump.

G. Steel Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1.

H. Welding Materials: AWS D1.1; type required for materials being welded.

I. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.06 SHOP FINISHING

A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

B. Do not prime surfaces in direct contact with concrete or where field welding is required.

C. Prime Painting: Use specified shop- and touch-up primer.
   1. Preparation of Steel: In accordance with SSPC-SP 2, Hand Tool Cleaning.
   2. Number of Coats: Two.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. When field welding is required, clean and strip primed steel items to bare metal.

B. Supply items required to be cast into concrete with setting templates.

3.03 INSTALLATION

A. Install components plumb and level, accurately fitted, free from distortion or defects.

B. Provide anchors, plates, angles, hangers, struts, columns, and studs required for connecting stairs to structure.

C. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

D. Provide welded field joints where specifically indicated on shop drawings. Perform field welding in accordance with AWS D1.1.

E. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.

F. Obtain approval prior to site cutting or creating adjustments not scheduled.

G. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION

SECTION 05520

ALUMINUM RAILING SYSTEM

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Extruded aluminum railing system with cable infill.

B. Related Sections:
   1. Section 03300 – Cast-in-Place Concrete: Placement of metal fabrications in concrete.

1.02 SUBMITTALS

A. See Section 01350 – Submittal Procedures:
   1. Product Data including color chart for initial color selection.
   2. Shop Drawings: Indicate materials, sizes, styles, fabrication, anchorage and installation details for railing system and infill.
   3. Samples:
      a. Post and rail sections– minimum 4 inch long piece of each type specified herein.
      b. Infill:
         1) Cable – minimum 8 inch long piece with end fittings.
         2) Aluminum chip with selected paint color for final color verification.
   4. Quality Assurance/Control Submittals:
      a. Qualifications: Proof of manufacturer's qualifications.
      b. Manufacturer's Installation Instructions.

B. Closeout Submittals: Reference Section 01700 –Contract Closeout; submit following items:
   1. Maintenance Instructions.
      a. Manufacturer's recommendation for periodic checking and adjustment of cables to maintain uniform cable tension.
      b. Manufacturer's recommendation for periodic cleaning of cables, glass panels, railing frames and related components to remove accumulated dirt, debris and stains.
   2. Special Warranties.

1.03 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer Qualifications: Minimum five years experience in producing aluminum railing systems.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Reference manufacturer's written instructions for Product Storage and Handling Requirements.

1.05 WARRANTY

A. Special Warranty:
   1. Cable and Connectors: 10 year limited warranty against defects in materials and workmanship.
   2. Paint Finish on Aluminum Extrusions and Components: 10 year limited warranty against cracking, flaking, blister, and peeling.

1.06 MAINTENANCE

A. Extra Materials: Provide one, approximately 3 ounce can, of touch-up paint per 100 feet of each color railing.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Feeney Inc
2603 Union St
Oakland, CA 94607

Toll Free: (800) 888-2418
Tel: (510) 893-9473
Fax: (510) 893-9484
E-mail: sales@feeneywire.com
Website: http://www.designrail.com

B. Product: DesignRail™ Aluminum Railing Systems.

C. Substitutions: Reference Section 01640 – Substitutions and Product Options.

2.02 MATERIALS

A. Extruded Aluminum Rails, Tubes, Profiles, Pipes, Plate & Sheet: 6000-series aluminum.

B. Cables: 1/8 inch diameter, 1 by 19 construction, Type 316 stainless steel, polished finish, commercial, dry grade cable with fittings specified below.
   1. Fittings:
      a. Horizontal Cables: Provide a 4-1/4 inch long stainless steel Threaded Terminal factory attached to one end of each cable and a stainless steel QuickConnect-SS™ fitting for field attachment on the other end.
      b. Include washers, nuts, end caps and any accessory items as recommended by manufacturer for installation conditions or as shown on Drawings.

2.03 COMPONENTS

A. Posts: 2-3/8 inch (61mm) square by 3/32 inch thick extruded aluminum tube. Stanchion mount as shown on Drawings.

B. Cap Rail: Type(s) specified below.
   1. Series 200: 3-1/2 inch by 1-1/4 inch by 3/32 inch thick extruded aluminum rectangular profile.
   2. Series 400: 2-11/16 by 3/4 inch by 1/16 inch thick extruded aluminum channel profile to support finished wood cap rail.

C. Cap Infill Channel: Extruded aluminum profile configured to secure specified infill.

D. Infill:
   1. Cables: Horizontal placement.

E. Fasteners for Interconnecting Railing Components: Stainless steel screws of type and size recommended by railing manufacturer.

F. Fasteners for Connecting Components to Other Construction: Type and size as shown on Drawings.

G. Aluminum end caps for exposed open ends of rails, tubes, and profiles.

2.04 FINISH

A. Shop Finish: Powder coat aluminum components in compliance with AAMA 2604.

B. Color: Silver.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine work upon which railings will be installed.

B. Coordinate with responsible entity to correct unsatisfactory conditions.

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

3.02 INSTALLATION

A. Follow manufacturer's installation instructions.

B. Isolate dissimilar metals where indicated on the Drawings with grommets, bushings, or coatings as appropriate.

C. Touch-up damaged paint surfaces with touch-up paint provided.

3.03 CLEANING

A. Clean soiled surfaces and cables using a mild detergent and warm water solution with soft clean cloths.

B. Clean cables thoroughly using synthetic scotch type pads and hot soapy water (or denatured alcohol) to remove residual lubricants; rinse thoroughly with clear water and wipe dry.

END OF SECTION