STANDARD SPECIFICATION
SECTION 05121 MISCELLANEOUS METALWORK

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, fabrication, and installation of structural steel, connecting bolts, pipes, galvanizing, welding electrodes, guard posts, ladders, covers and frames, vents, air valve enclosures, supports, eyebolts, anchors, and other miscellaneous metalwork.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Standard Drawings.

B. Record Drawings and Submittals: STD SPEC 01300.

C. Painting and Coating: STD SPEC 09900.

D. Thermally Sprayed Metallic Coating (Flame Spray): STD SPEC 09965.

1.03 SUBMITTALS

A. Submit submittal packages in accordance with Standard Specification Section 01300.

B. Submit drawings of fabricated items, such as pipe supports, vents, and air valve enclosures. Show dimensions and reference materials of construction by ASTM designation and grade.

C. Submit manufacturer's catalog data and dimensional drawings for lifting eyebolts and inserts; ladders with safety post; manhole covers and frames; and anchor bolts.

PART 2 - MATERIALS

2.01 STRUCTURAL STEEL

Material for bolted or welded construction shall conform to ASTM A 36.

2.02 BOLTS

Steel anchor and connection bolts shall conform to ASTM A 307, unless noted otherwise. Provide galvanized bolts. Provide with galvanized self-locking nuts or lockwashers and plain nuts.

2.03 STEEL PIPE

Pipe for guard posts and vault vents shall be standard weight (Schedule 40) conforming to ASTM A 53 or A 120, and hot dipped galvanized.

2.04 GALVANIZING

Zinc coating for plates, bolts, anchor bolts, and threaded parts shall be in accordance with ASTM A 153. Structural steel shall be zinc coated in accordance with ASTM A 123.

2.05 WELDING ELECTRODES

Welding electrodes for structural steel shall conform to AWS A5.5. Use electrodes in the E-70 series.

2.06 GUARD POSTS

Use standard weight (Schedule 40) steel pipe, hot dipped galvanized, and 6 feet long. Coat aboveground surfaces per Standard Specification Section 09900, System No. 20. Finish color to be OSHA Yellow.

2.07 VAULT LADDERS

A. Ladders shall be 16 inches wide between rails, welded steel construction, and galvanized after fabrication. Minimum diameter of rungs shall be 3/4-inch. The distance between rungs shall not exceed 12 inches and shall be uniform throughout the length of the ladder. Provide galvanized steel supports at the top and bottom of the ladder and anchor to the precast concrete vault with adhesive anchor bolts. Ladders and supports shall be Alhambra Foundry Company No. A-3885, or District approved equal.

B. Mount on the ladder rungs below the manhole cover a telescoping safety post. The post shall be fabricated of steel with telescoping tubular section that locks automatically when fully extended. The upward and downward movement shall be controlled by a stainless steel spring balancing mechanism. The unit shall be galvanized with special alloy spring and be complete with fasteners for securing to the ladder rungs. The telescoping safety posts shall be a Model LU-2 Bilco Ladder UP, or District approved equal.

2.08 COVERS AND FRAMES

Manhole covers and frames shall be cast iron and designed for traffic loading. Castings shall be smooth, clean and free from blisters, blowholes, and shrinkage. Covers shall seat firmly into the frames without rocking. Frames shall be provided with anchor bolts and neoprene gasket. Covers shall be provided with stainless steel cap screws and lifting holes. Dip castings in a preparation of asphalt or coal tar and oil to form a firm and tenacious coating. Covers and frames shall be Alhambra Foundry Company No. A-1106, or District approved equal.

2.09 VAULT VENTS

A. Fabricate vault vents as shown on the Drawings. Vault vents shall be of welded steel construction and hot dipped galvanized after fabrication. Coat vault vents per Standard Specification Section 09900, System No. 20. Finish color to be OSHA Blue.

B. Use standard weight (Schedule 40) steel pipe with one threaded end for the riser section. At the plain pipe end, cut three 5-inch long by 3-inch high window openings evenly spaced along the circumference of the pipe. Locate top of window 1-inch from end of pipe. Place

10 x 10 steel wire cloth over the window openings on the inside surface of the pipe and tack weld.

C. Use 10-gauge steel pipe for the hood. Center a circular cut 1/4-inch thick plate on the plain pipe end of the riser section. Attach the plate to the riser with a full circle fillet weld.

2.10 PIPE SUPPORTS

Fabricate pipe supports as shown on the Drawings. Pipe supports shall be of welded steel construction and flame spray coated after fabrication per Standard Specification Section 09965. Coat supports per Standard Specification Section 09900, System No. 10. Color shall match adjacent piping.

2.11 LIFTING EYEBOLTS

A. Locate eyebolts and inserts over the centerline of the piping at the locations shown on the Drawings. Eyebolts and inserts shall have a minimum safety factor of 3:1 and be rated for a working load of 3,000 pounds.

B. Provide drop forged steel eyebolts with shoulder pattern and hot dipped galvanized. Provide eyebolts with 1-inch diameter by 2-1/2-inch long shank and fully threaded. Provide a 4-inch square by 3/8-inch thick galvanized steel plate washer for each eyebolt.

C. Provide inserts of the ferrule wing nut design with National Course threads to match the eyebolts. Cast the inserts in the roof slab of the vault at the locations identified in the Drawings.

2.12 THREADED INSERTS

Threaded inserts to be cast into the precast concrete vaults shall be of ductile iron construction with Standard N.C. threads. Provide 5/8-inch diameter inserts for the end walls. Inserts shall be Burke Hi-Tensile Threaded Inserts, or District approved equal. Inserts shall be cast in place at the locations identified in the Drawings.

2.13 ADHESIVE ANCHORS

Adhesive anchors shall be a two component system consisting of an all threaded anchor rod with nut and washer, and the adhesive capsule. Anchor rods shall be Type 304 stainless steel conforming to ASTM F 593 with nuts conforming to ASTM F 594. The adhesive capsules shall contain a vinylester resin and hardener within a sealed glass capsule. Adhesive anchors shall be Hilti HVA Adhesive Anchor System, or District approved equal.

2.14 WEDGE ANCHOR BOLTS

Anchor bolts for use in concrete shall be a stud type expansion anchor with a single piece wedge that performs as three independent wedges. Stud and wedge shall be Type 304 stainless steel conforming to ASTM A 276. Nut shall be Type 304 stainless steel conforming to ASTM F 594 with washer of similar material. Wedge anchor bolts shall be Hilti Kwik Bolt II, or District approved equal.

PART 3 - EXECUTION

3.01 STORAGE OF MATERIALS

Store structural material, either plain or fabricated, above ground on platforms, skids, or other supports. Keep material free from dirt, grease, and other foreign matter and protect from corrosion.

3.02 FABRICATION AND ERECTION

A. Fabricate miscellaneous metal items to straight lines and true curves. Drilling and punching shall not leave burrs or deformations. Continuously weld permanent connections along the entire area of contact. Exposed work shall have a smooth finish with welds ground smooth. Joints shall have a close fit with corner joints coped or mitered and shall be in true alignment. Unless specifically indicated on the Drawings, there shall be no bends, twists, or open joints in any finished member nor any projecting edges or corners at intersections. Conceal fastenings wherever possible. Built-up parts shall be free of warp. Exposed ends and edges of metal shall be slightly rounded. All boltholes shall be 1/16-inch in diameter larger than bolt size.

B. Clean the surfaces of metalwork to be in contact with concrete of rust, dirt, grease, and other foreign substances before placing concrete.

C. Set embedded metalwork accurately in position when concrete is placed and support it rigidly to prevent displacement or undue vibration during or after the placement of concrete.

D. Repair or replace metal items with damaged galvanized surfaces. Accomplish repairs with a field applied, cold galvanizing repair compound. Apply in accordance with the manufacturer’s instructions.

3.03 WELDING

A. Perform welding on steel by the Shielded Metal Arc Welding (SMAW) process. Welding procedures shall comply with AWS B3.0.

B. Provide one pass for metal of 3/16-inch thickness plus one additional pass for each additional 1/8-inch in metal thickness.

C. Produce weld uniform in width and size throughout its length with each layer of weldment smooth; free of slag, cracks, pinholes, and undercuttings; and completely fused to the adjacent weld beads and base metal. Avoid irregular surface, nonuniform bead pattern, and high crown. Form fillet welds of the indicated size of uniform height and fully penetrating. Accomplish repair, chipping, and grinding of welds in manner that will not gouge, groove, or reduce the base metal thickness.

3.04 BOLTING

A. Use steel bolts to connect structural steel members.

B. Drive bolts accurately into the holes without damaging the thread. Protect boltheads from damage during driving. Boltheads and nuts shall rest squarely against the metal. Where

self-locking nuts are not furnished, bolt threads shall be upset to prevent the nuts from backing off.

C. Bolts shall be of the length that will extend entirely through but not more than 1/4-inch beyond the nuts. Draw boltheads and nuts tight against the work. Tap boltheads with a hammer while the nut is being tightened. After final tightening, lock the nuts.

3.05 ADHESIVE ANCHORS

Drill hole in concrete by means of a percussion hammer drill. Blow compressed air in resulting hole and remove dust. Insert adhesive capsule into hole. Screw stud halfway into nut, screw drive unit into nut/stud assembly, and secure drive unit into chuck of rotary percussion hammer drill. Break capsule with chamfered end of stud. Using a rotary hammer drill, drive stud to bottom of hole. Release friction lock and remove drill. Allow resin to cure for the time recommended by the capsule anchor manufacturer before loading stud.

END OF SECTION