SECTION 03 20 00

CONCRETE REINFORCING

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Furnish and install reinforcing steel bars and accessories and perform all related and incidental work for the following:
   1. Cast-in-place concrete thrust blocks as shown on the contract drawings.
   2. Other equipment pads and curbs as shown on the contract drawings.

1.2 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete

1.3 REFERENCES

Latest editions of the following codes and standards:

A.	ACI 301	Structural Concrete for Buildings
B.	ACI 315	American Concrete Institute - Detailing Manual
C.	ACI 318	Building Code Requirements for Reinforced Concrete
D.	AWS D1.4	Structural Welding Code
E.	CRSI	Manual of Standard Practice
F.	ASTM	American Society for Testing and Materials Standards

1.4 SUBMITTALS

A. Shop Drawings:
   1. The Contractor shall submit to the Engineer for review reinforcing steel shop drawings, prepared in accordance with ACI 315, showing a list of materials, sizes, dimensions, cutting, bending, placement details, splicing and/or laps
   2. Reinforcing steel shall not be fabricated and placed before the shop drawings have been reviewed and approved by the Engineer, and returned to the Contractor. Review of shop drawings by the Engineer in no way relieves the Contractor from the full responsibility for both the accuracy of these shop drawings, and the accurate and complete placing of the work.

B. Mill Test Reports: Certified mill test reports (tensile and bending), for each heat or melt of steel, showing physical and chemical analyses, shall be submitted to the Engineer before delivery to the job site. Where reinforcing is required or requested to be welded, mill test reports shall verify the weldability of the steel.

1.5 QUALITY ASSURANCE

A. Perform concrete reinforcement work in accordance with CRSI Manual of Practice and conforming to ACI 315. Also see paragraph 3.3 for inspection requirements.

1.6 DELIVERY, STORAGE AND HANDLING

A. Reinforcement shall be shipped and stored with bars of the same size and shape fastened in bundles with durable tags, marked in a legible manner with waterproof

markings showing the same designations as shown on the approved placing drawings.

B. Reinforcement shall be stored off the ground and shall be protected from moisture and kept free from dirt, oil, or other injurious contaminants. All steel which cannot be properly identified will be rejected, and shall be immediately removed from the job site.

PART 2 - PRODUCTS

2.1 REINFORCING MATERIALS

A. Steel bars: ASTM A615, Grade 60 for #4 and larger, and Grade 40 for #3, except where otherwise indicated. All reinforcement shall be deformed billet bars.

B. Steel wire: Cold drawn, plain, ASTM A82, unless otherwise indicated.

2.2 ACCESSORIES

A. Tie wire: Minimum 16 gage galvanized annealed wire.

B. Supports and spacers: Provide spacers, chairs, bolsters, and other devices to support and secure the reinforcement in place. Use plastic tip chairs for exposed finished concrete surfaces.

2.3 FABRICATION

A. All reinforcing steel shall be shop fabricated to conform to the required shapes and dimensions, in accordance with CRSI standards. Field bending will not be permitted, except that a No. 5 and smaller bars may be bent in the field when allowed by the Engineer.

B. Bars shall be cold bent.

C. Bars shall be bent around a revolving collar having a diameter not less than that recommended by the ACI 318. Hooks shall conform to the same code.

D. Bars that are to be butt spliced, placed through limited diameter holes in metal or have a threaded end shall have the applicable end(s) saw-cut.

E. Bars shall not be damaged in bending or straightening, and bars with kinks or improper bends shall not be used.

PART 3- EXECUTION

3.1 PLACEMENT

A. Before placing concrete, the reinforcement shall be cleaned, free of mortar, oil, grease, dirt, loose mill scale, loose rust, and any other coating that would destroy or reduce the bond.

B. Contractor shall not place any reinforcement until approved shop drawings have been received on the job site.

C. Provide continuous reinforcement where possible, splice only as shown or approved stagger splices where possible.

D. Reinforcing bars shall be firmly and securely held in position by wiring with minimum No. 16-gauge black annealed wire at intersections, and by using precast mortar blocks or metal chairs, spacers, metal hangers, supporting wires, or other approved devices of sufficient strength to resist crushing under full load and to prevent displacement during concrete placing operations.

E. Minimum clear protective covering for reinforcement adjacent to concrete surfaces and minimum clear bar spacing shall be as specified on drawings, but in no case shall it be less than values specified in the "Building Code Requirements for Reinforced Concrete" (ACI 318).

F. Placing bars on layers of fresh concrete as the work progresses, or adjusting bars during the placing of concrete, will not be permitted.

3.2 SPLICING

A. Lap Splices:
Reinforcing bars shall be spliced as indicated by lapping and securely wiring together. Splices at locations other than those indicated are subject to the approval of the Engineer and, if permitted, shall conform to the lap lengths specified in ACI-318, except as indicated on Contract Drawings.

B. Welded Splices:
No reinforcing bars shall be welded or tack welded either during fabrication or erection unless specifically called for on the drawings, specified herein, or with prior written consent of the Engineer. All bars that have been welded without such approval shall be rejected and immediately removed from the work. When welding of reinforcement is approved or called for, it shall conform to the AWS Structural Welding Code-Reinforcing Steel, AWS D1.4. If the Contractor chooses to use ASTM A706 reinforcing steel to facilitate welding, it shall be at no extra cost to the City. Inspection by a testing laboratory is required for all reinforcing bar welding.

3.3 INSPECTION

A. Before any concrete is placed, the placing of reinforcing steel shall be inspected by the Contractor’s Testing Agency. Any errors or discrepancies shall be corrected before the concrete is placed. Notify the Engineer not less than 48 hours before reinforcing steel inspection is required.

END OF SECTION