

ITEM 30

FENCING

1.0 DESCRIPTION. The Contractor shall furnish all equipment, materials, tools, labor, and service necessary for removal and relocation or installation of new fencing and gates together with those accessory items shown or called for on the drawings or detailed in these specifications.

2.0 SUBMITTALS. The contractor shall submit the following:

A. Reference Standards. Latest revisions:

1. ASTM F1083.
2. ASTM F-668 Type 2B.
3. ASTM A-641-71A.
4. ASTM F 1664.
5. ASTM F 1184, Class 2 (for gates).
6. ASTM D 1784 (for PVC coatings).
7. ASTM F964 - Standard specification for rigid PVC, exterior profiles used for vinyl fencing and railing.

B. Shop Drawings.

1. All shop drawings shall be submitted electronically for review and approval. Within ten working days they will be returned either approved or marked for further action by the contractor. Internet/web-site printouts are not acceptable for shop and approval Drawings.
2. Shop drawings shall include the entire fence system which shall include but not be limited to; fence fabric, framing, mainline, corner and gate posts, rails, braces, tension bars and wire, bands, fittings, barb extension arms and wire necessary to complete all fencing in accordance with all detail drawings and specifications.
3. Shop drawings shall show relationship of all components, connections, mounting arrangements and support items.
Shop drawings shall be complete in all details and shall include identified parts lists.
4. After examination of such drawings by the Engineer and the return thereof, the Contractor shall make such correction to the drawings as have been indicated and shall furnish the Engineer with electronic corrections.
5. Schedule: The fence manufacture shall provide a schedule of the proposed production and delivery of the panels and all componentry. Said schedule shall include:
 - a. Shop drawing submittal dates.

- b. Fence and gate materials order date, manufacture date, shipment date, estimated arrival date.
- 6. Shop drawings shall include all Manufacturers' illustrated catalog data and parts schedule in sufficient detail to serve as a guide in assembly and disassembly of all components to include ordering of repair parts as specified under this item.
- 7. All information submitted shall be identified as to the project specific application of the fence equipment described. If the literature describes multiple models and/or options, the information not pertaining to this specific project and/or project specific application shall be neatly and clearly lined out.
- 8. The fence Contractor and/or supplier shall be responsible for all materials and components omitted and/or installed incorrectly.
- 9. The Engineer's review of drawings and specifications shall extend only to determine the conformity of such equipment and materials with the general features of the Contract Drawings and Contract Specifications prepared by the Engineer.
- 10. Product Data: Manufacturer's data sheets on each product to be used, including:
 - a. Preparation instructions and recommendations.
 - b. Storage and handling requirements and recommendations.
 - c. Installation methods.
- 11. Verification Samples: For each finish product specified, two samples, minimum size 3 inches (76 mm) square, representing actual product, color, and patterns.
- 12. Provide manufacturer's maintenance instructions that include recommendations for periodic cleaning and maintenance of all components.
- 13. Review of shop drawings shall not be considered as a guarantee of measurements or of building conditions. Where drawings are reviewed, said review does not mean that drawings have been checked in detail; said review does not, in any way, relieve the Fence Contractor from their responsibility for furnishing material and performing work as required by the contract drawings and specifications. Engineer takes no responsibility, financial or otherwise, for accuracy of reviewed shop drawings nor for the performance of the products reviewed.

C. Calculations.

- 1. It shall be the responsibility of the Fence Contractor to determine the correctness of all dimensions and minor details of fence and materials so that they will fit into the completed work and so that, when incorporated into the completed work, correct operation will result.

D. Certifications.

- 1. The fence manufacturer shall certify products meet or exceed specified requirements.

3.0 MATERIALS. The Contractor shall furnish and install complete fence system which conforms to the Drawings and the specifications herein.

A. Chain Link Fencing.

1. Fabric. All fabric shall comply with the following:
 - a. Vinyl coated steel chain link fabric shall be furnished in accordance with ASTM F-668 Type 2B.
 - b. The core wire and break load will determine the gauge of the wire. The steel core wire shall be galvanized in accordance with ASTM A-641-71A.
 - c. The fabric shall be attached to tension wire at intervals of 24" with vinyl coated eleven-gauge hog rings.
 - d. All fence fabric (green) shall be Standard Industrial Residential - Mesh 2" +/- 1/8" #9 gauge -Core wire diameter 0.148" Break load 1290 lbs.
2. Manufacturer qualifications: A firm engaged in the manufacture of fence and gates of types and sizes specified, and whose products have been in satisfactory use in similar service for a minimum of five years.
3. Framing.
 - a. All round posts shall be Schedule 40 Steel Pipe conforming to ASTM F1083.
 - b. All steel parts shall be hot-dipped galvanized as per ASTM, prior to vinyl coating. Thickness of vinyl coating shall be 10-14 mils applied by fusion bonding.
 - c. Line posts shall not be spaced at more than ten feet.
 - d. The following tables summarize framing:

END, CORNER AND PULL POSTS	CROSS SECTION	O. D. (INCHES)	MINIMUM WEIGHT LBS. PER FOOT
FABRIC HT. 6'0"	ROUND	3.00	5.79

LINE POSTS	CROSS SECTION	O. D. (INCHES)	MINIMUM WEIGHT LBS. PER FOOT
FABRIC HT. 6'-0"	ROUND	3.00	5.79

GATE POSTS	CROSS SECTION	O. D. (INCHES)	MINIMUM WEIGHT LBS. PER FOOT
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6'-0" HEIGHT	ROUND	6.00	9.10
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GATE FRAMES	CROSS SECTION	O. D. (INCHES)	MINIMUM WEIGHT LBS. PER FOOT
8'-0" HEIGHT	ROUND	2.00	2.60

RAILS & TRUSS BRACES	CROSS SECTION	O. D. (INCHES)	MINIMUM WEIGHT LBS. PER FOOT
(FOR FABRIC 6'-0" HEIGHT)	ROUND	1.66	2.27

- e. Rails and braces.
 - i. The fence shall have a continuous top rail 1.66" O.D. vinyl coated tubing weighing 2.27 lbs. per foot. The top rail shall pass through openings provided in the line post top and each length shall be coupled with an internal swaged sleeve for a distance of 3". The chain link fabric shall be attached to the top rail by means of a 13 (.091) gauge vinyl coated tie wire double wrapped, at intervals not exceeding 24".
- f. Truss braces.
 - i. A brace rail of 1.66" O.D. vinyl coated tubing weighing 2.27 lbs. per ft. shall be provided between each terminal post and the next adjacent line post.
 - ii. Each brace rail shall have attachments for a 5/16" vinyl coated truss rod and turnbuckle attachment.
- g. Tension Wire. A vinyl-coated heavy duty, seven-gauge coiled spring tension wire shall be provided along the bottom of fabric.
- h. The metallic coated core wire shall have a breaking strength of 1950 lbs. PVC-coated tension wire shall be manufactured in accordance with ASTM F 1664.
- i. Tension Bars, Bands, and Fittings. Fabric shall be held in place at all terminal post by means of a fiberglass tension bar not less than 3/16" x 3/4" and not less than 2" shorter than the fabric height.
- j. The tension bar shall be attached to the posts by means of vinyl coated tension bands not to exceed intervals of 15". Attachment bolts for bands shall be 5/16 x 1 1/2" galvanized carriage bolts with nuts.

- k. Bolts and nuts shall be field painted to match vinyl color. One tension bar shall be provided for each end and gate post and two for each corner and pull post.
- l. Barbed wire & extension arms.
 - i. Vinyl coated barbed wire arms for supporting 3 strands of barbed wire shall be set at a 45-degree outward angle. Each arm shall be of sufficient strength to withstand a weight of 250 pounds applied at the outer strand of barbed wire.
 - ii. Arm shall have a hole for passage of top rail, where required.
 - iii. Barbed wire shall be maximum security type wires with aluminum barbs spaced 3" apart.
- 4. Gates.
 - a. Swing and slide gate frames. - Gate frames shall be constructed of vinyl coated 2" diameter aluminum pipe joined at the corners by welding.
 - b. On leaf's over ten-foot-wide, internal vertical bracing of 1-5/8" vinyl coated square aluminum tubing shall be provided. The fabric shall be attached to the frame on all four sides by means of special hook connectors and tension rods.
 - c. Vertical extensions shall be installed one foot above the gate frame to accommodate 3 stands of barbed wire.
 - d. All gates shall be equipped with galvanized steel hinges and latch.
 - e. The contractor shall provide locks manufactured and keyed to the County standard locks.
 - f. Double gates shall be equipped with a drop bar and gate holdbacks. Movable fittings shall be field coated with a vinyl coating specially prepared for this purpose.
 - g. Slide gates shall fully open one way with stops at both ends to prevent derailment.
- 5. Privacy Material. The Plastic Fence slats shall be woven through the fence fabric to provide maximum privacy and shall be FIN/SLAT by Pioneer Plastics or equal. See-thru type slats are not acceptable.
 - a. The fence slats shall be manufactured from a combination of quality base high-density virgin polyethylene; color pigments, and ultra violet inhibitor, specifically designed to retard the harmful effects of sunlight and lengthen the useful life of the product. The slats shall have a wind load factor of 86% when installed. Slats shall be green in color, the same as the color of the vinyl coating on the fence.
- 6. Both line and terminal posts shall be set in cylindrical concrete foundations. A hole shall be excavated for the full depth of the post a minimum of 36 inches, not less than 15" in diameter for gate posts and 12" diameter for line posts. The concrete shall be as specified under Item 4.

B. Vinyl Fencing.

1. Vinyl shall be produced by a certified member of the Vinyl Manufacturers Association.
2. Acceptable Manufacturers: Duralux, Bufftech (Certainteed), Legend (Master Halco) Requests for substitutions will be considered but will be examined as an "as equal" to those named above.
3. Privacy Style: Galveston (Bufftech) (or equal).
 - a. Height: 6' or 8' as shown on plans.
 - b. Section Width: 8 foot
 - c. Deco Rails: 2 inch by 6 inch
 - d. Midrail: Provide for 84-inch high fence sections.
 - e. All rails shall be galvanized steel reinforced
 - f. Tongue and Groove Panels: 7/8 inch by 7 inch.
 - g. Posts: 5 inch by 5 inch.
 - h. Gates and Posts shall match fence style.
 - i. Colors: Almond, Tan or Khaki
4. Vinyl post caps:
 - a. Size: 6 inch Flat External (Almond, Tan or Khaki) as desired by owner.
5. Cantilever gate hardware (where applicable).
 - a. Gate Dimensions:
 - i. Height = As shown on Plans.
 - ii. Width – as required per detailed drawings.
6. Vinyl gate frame – As required but shall match fabrication in accordance with ASTM F-1184, Class 2.
 - a. Diagonal bracing shall be appropriate for the vinyl gate system but be as supportive as a chain link bracing (truss rods of 3/8")
 - b. Top Rail – enclosed combination 1-piece track, aluminum extrusion with a weight of 3.72 lb./ft.
 - c. Track must withstand a reaction load of 2,000 lbs.
 - d. Design truck assembly to withstand same reaction load as track. The truck assembly will consist of a swivel type, zinc die cast, with 4 sealed lubricant ball bearing rollers, 2 inches in diameter by 9/16 inch in width, and 2 side-rolling wheels to ensure truck alignment in track. Mount trucks on post brackets using 7/8 inch diameter ball bolts with 1/2-inch shank.
 - e. The gate hangers, brackets, guide assemblies, and stops shall consist of malleable iron or steel, galvanized after fabrication. Latch: Stainless steel with aluminum latch clapper. Provide positive latch with provisions for padlocking.
 - f. The bottom guide wheel assemblies, where required, shall consist of two 4-inch diameter rubber wheels, straddling bottom horizontal gate rail, allowing adjustment to maintain gate frame plumb and in proper alignment. Attach one assembly to each guide post.
 - g. The gateposts will be set in 3,500 psi concrete in accord with Item 4.

4.0 EXECUTION. The Contractor shall provide all labor, equipment and material necessary to construct, erect and install all fencing and gates as indicated within this specification and as shown on all Contract drawing sheets.

A. General. All fence materials shall be installed in a first-class workmanlike manner, in accordance with Chain-Link Fence Manufacturers Institute specifications.

1. Deliver materials to the project site in manufacturer's original wrappings and containers, labeled with suppliers or manufacturer's name, material or product brand name, and lot number, if any.
2. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
3. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
4. Project conditions: Maintain environmental conditions (temperature, humidity, & ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
5. Line and terminal posts shall be of sufficient length to allow 36" settings into concrete footing. Maximum spacing of line posts shall be 10'-0".
6. Fence to follow ground line grade with fabric approximately 2"-3" off the finished grade unless otherwise provided for in this specification. All material is subject to testing.
7. In new pavement surfaces, fence posts shall be installed prior to any paving.

B. Vinyl Fencing. Verification of Conditions: Examine locations where fencing is to be installed for any conditions detrimental to the proper and timely completion of the work.

1. Preparation:
 - a. Clean surfaces thoroughly prior to installation.
 - b. Prepare the grade and remove surface irregularities, if any, which may cause interference with the installation of the fence.
 - c. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
2. Install in accordance with manufacturer's instructions.
 - a. Set posts and gate posts for gate openings using the dimensions, post installation depths and excavation diameters as indicated on the Drawings.
 - b. Center and align posts, place concrete around posts and vibrate or tamp for consolidation. Recheck vertical and top alignment of posts, and make necessary corrections.

3. Install gates plumb, level, and secure for full opening without interference. For cantilever gates, follow manufacturer's instructions. Adjust hardware for smooth operation.
4. Clean/touch-up, repair, or replace damaged products before Substantial Completion.
 - a. Clean the work according to manufacturer's written instructions.
5. Post hole excavations shall be scattered uniformly away from the posts. Remove mortar from exposed posts using a 10 percent solution of muriatic acid followed immediately by several rinses with clean water.
6. Protect installed products until completion of project.

5.0 ELECTRICAL. This section is not applicable.

6.0 QUALITY ASSURANCE. Installer Qualifications: A firm with a minimum of two years of successful installation experience with projects utilizing vinyl fence and gates similar in type and scope to that required for this Project.

A. Testing. This section is not applicable.

B. Observation.

1. SCMSD designated representative will visually observe the work performed. The representative will notify the Engineer of any discrepancies with the contract documents in the course of the contractor performing the work. The progress observations by the SCMSD do not waive any rights or remedies, nor divest the Contractor of any responsibility for contract compliance or liability for damage.

C. Warranty.

1. Lifetime Limited, Non-Prorated Warranty on Material and 5 Year Prorated Labor Warranty.

7.0 MEASUREMENT. Measurement shall be applicable for the actual number of each type of fencing gate as indicated on project drawings.

8.0 PAYMENT. The price for this item installed in accordance with this specification and all Contract drawings shall include all materials, labor, tools and appliances required to complete the fencing and appurtenance components as shown on the Drawings and shall be included in the below indicated bid pricing for each item.

<u>Item</u>	<u>Unit</u>	<u>Description</u>
30	LS	Chain Link Fencing

SCMSD
P-[XXX] [PROJ NAME]

30.8

Fencing
Rev. 3/8/2023

30	LS	Vinyl Fencing
30	EA	Vehicle Slide Gate, Per Plan
30	EA	Man Gate, Per Plan
30	EA	Metal Swing Gate

END OF SECTION