

## SECTION 02830

### CHAIN LINK FENCING AND GATES

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

###### A. Scope

1. Furnish and install new chain link fencing, gates, and appurtenances at locations indicated on the Drawings

###### B. Additional Requirements Specified Elsewhere

1. Section 01010: Summary of Work
2. Section 01340: Shop Drawings, Product Data, and Samples
3. Section 01500: Construction Facilities and Temporary Controls
4. Section 01600: Materials and Equipment

###### C. Related Requirements Specified Elsewhere

1. Section 02200: Earthwork
2. Section 02500: Paving and Surfacing
3. Section 03300: Cast-in-Place Concrete
4. Colorado Department of Transportation (CDOT) M&S Standards

##### 1.2 QUALITY ASSURANCE

###### A. Reference Standards

1. ASTM A120: Pipe, Steel, Blade and Hot-Dipped Zinc Coated (Galvanized) Welded and Seamless for Ordinary Uses
2. ASTM A121: Zinc Coated (Galvanized) Steel Barbed Wire
3. ASTM A392: Zinc Coated (Galvanized) Steel Chain-Link Fence Fabric
4. ASTM A471: Aluminum Coated Steel Chain-Link Fence Fabric
5. ASTM A500: Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
6. ASTM A501: Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
7. ASTM A585: Aluminum-Coated Steel Barbed Wire

##### 1.3 SUBMITTALS

- A. Shop Drawings and Product Data: Submit complete detail drawings and product data for fence, gates, and accessories in accordance with Section 01340

## PART 2 - PRODUCTS

### 2.1 MATERIALS

#### A. Steel Fencing

1. Fabric: 9 gauge, 2" mesh; galvanized ASTM A392, Class II or aluminum coated, ASTM A491, Class II; barbed selvage top and bottom
2. Posts: Steel pipe, ASTM A120, standard weight (Schedule 40); or steel hollow structural tubing, ASTM A500 or A501
  - a. Line posts: 2<sup>3</sup>/<sub>8</sub>" OD pipe, 3.65 lb/ft; or 2" sq, 3.85 lb/ft
  - b. Terminal (end, corner and pull) posts: 2<sup>7</sup>/<sub>8</sub>" OD pipe, 5.79 lb/ft; or 2<sup>1</sup>/<sub>2</sub>" sq, 5.59 lb/ft
  - c. Gate posts
    - 1) Leaf 6' or less: 2<sup>7</sup>/<sub>8</sub>" OD pipe, 5.79 lb/ft; or 2<sup>1</sup>/<sub>2</sub>" sq, 5.59 lb/ft
    - 2) Leaf over 6' but less than or equal to 13': 5" OD pipe, 9.1 lb/ft; or 3" sq, 9.10 lb/ft
    - 3) Leaf over 13' but less than or equal to 18': 6<sup>5</sup>/<sub>8</sub>" pipe, 18.97 lb/ft
3. Top rails: 1<sup>5</sup>/<sub>8</sub>" OD steel tubing, 1.40 lb/ft
4. Rail couplings: Sleeve type, 6" long
5. Bracing: Same as top rails with <sup>3</sup>/<sub>8</sub>" diameter steel truss rod and tightener
6. Stretcher bars: Steel, 3/16" by <sup>3</sup>/<sub>4</sub>" or equivalent area
7. Fabric ties: Aluminum bands or wires, 9 gauge for tying to line posts and top rails, 11 gauge hog rings for tying to tension wire
8. Tension wire: Galvanized or aluminum coated coil spring wire, 7 gauge
9. Post tops: Pressed steel, malleable iron with pressed steel extension arm, or one-piece aluminum casting: with hole for top rail designed to prevent entry of moisture into tubular posts
10. Barbed wire: Galvanized, ASTM A121, Class II, or aluminum coated, ASTM A585, Class II two 12<sup>1</sup>/<sub>2</sub> gauge steel wires with 4-point barbs
11. Barbed wire support arm
  - a. One (1) piece, galvanized steel, 45° barb arm with support for three barded wire strands
  - b. Top strand located 12" horizontally from fence line
  - c. Arm shall support 200 pounds applied to outer strand
12. Gate frames: Steel tubing, 1<sup>7</sup>/<sub>8</sub>" OD, 2.09 lb/ft; or 2" sq, 2.10 lb/ft
13. All materials galvanically compatible

#### B. Slide Gate Opener

1. Designed specifically for operation of a slide gate
2. Capable of operating a 2,000 pound gate up to 37' in length
3. Motor: 1 hp minimum (two (2) <sup>1</sup>/<sub>2</sub> hp), 120 VAC, 60 Hz, 8.4 amp rated
4. Drive
  - a. Worm gear reducer
  - b. Heavy duty transmission
  - c. Dual motor drive system
5. Emergency release in case of power loss
6. Weatherproof enclosure, high density polyethylene plastic
7. Speed: 1.0 FPS
8. Controls

- a. Remote wireless open/close input from Operations Facility
  - b. Open/close position input from remote wired keypad at gate entry
  - c. Electronic reversing sensor
  - d. Automatic closing timer: 0-60 seconds
  - e. Numeric keypad with gooseneck stand
    - 1) Provide on entrance and exit sides
  - f. Fire Department lock box
  - g. Plug-in loop detector wiring on exit side of gate
    - 1) Future use of detector loop
9. Design basis: Chamberlain Elite SL3000UL 1HP™

#### C. Digital Ingress/Egress Keypad

- 1. Gooseneck, post-mounted
  - a. Gooseneck pedestal: AAS 18-001 or equal
- 2. Call button with 8 ohm speaker allowing integration of built-in intercom station
- 3. 16 gage stainless steel faceplate and metal keypad
- 4. Keypad housing: 16 gage, heavy metal, powder-coated enclosure
- 5. Fully programmable, 4 digit codes
- 6. Electrical requirements: 12 VAC
- 7. Design basis: American Access Systems, Inc., Advantage DK ADV-1000i

#### D. Intercom Master Station

- 1. Interface with digital keypad
- 2. Release button to activate relay on slide gate opener
- 3. Design basis: AAS LEM-1DL k Aiphone Master 1 Inside to 1 Outside

## 2.2 FABRICATION AND MANUFACTURE

- #### A. Steel Fencing: Hot dip galvanized or aluminum coat all steel or malleable iron parts and accessories after fabrication

#### B. Swing Gates

- 1. Swing type, hinge to swing 180° from close to open
- 2. Complete with frames, latches, stops, keepers, hinges, fabric, braces, and three strands of barbed wire
- 3. Provide intermediate members and diagonal truss rods as required for rigid construction free of sag and twist
- 4. Joints between frame members
  - a. Welded or heavy fittings
  - b. Rigid and watertight
- 5. Fabric
  - a. Same as fence
  - b. Attach to frame ends with stretcher bars, bolt hooks or other mechanical means
- 6. Barbed wire
  - a. Same as fence
  - b. Attach to gate end posts with brace bands
  - c. Three (3) strands mounted vertically at 4" intervals

7. Hinges
  - a. Heavy patterns with large bearing surfaces
  - b. Twisting or turning of hinges under the gate action is unacceptable
8. Latches
  - a. Single leaf gates less than 10' wide: Forked latches or as specified for other gates
  - b. All others
    - 1) Plunger bar type
    - 2) Full gate height
    - 3) Arranged to engage gate stop
    - 4) Stops: Roadway plates with anchors arranged to engage plunger
  - c. Latched padlockable with lock accessible from both sides of gate
  - d. Keepers: Mechanical devices for securing and supporting free end of gates in the open position

### C. Slide Gate

1. Cantilever slide gate type
  - a. Clear opening: 24'-0"
2. Complete with frame, stops, keepers, fabric, braces, and three strands of barbed wire
3. Provide intermediate members and diagonal truss rods as required for rigid construction free of sag and twist
4. Joints between frame members
  - a. Welded or heavy fittings
  - b. Rigid and watertight
5. Fabric
  - a. Same as fence
  - b. Attach to frame ends with stretcher bars, bolt hooks or other mechanical means
6. Barbed wire
  - a. Same as swing gate
  - b. Three (3) strands mounted vertically at 4" intervals
7. Rollers
  - a. 4" diameter cold rolled steel
  - b. 4" diameter ball bearing roller with roller guard
  - c. Suitable for gate length and weight as shown on the Drawings

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Final Grading: Grade ground surface irregularities to maintain not more than 2" clearance below the bottom of fence fabric

## 3.2 ERECTION

### A. General

1. Install to alignment and finish grade indicated on drawings
2. Install in accordance with CDOT M-Standard M-607-2

### B. Posts

1. Set plumb
2. Spacing: Equally spaced, maximum 10' on center
3. On steep grades posts may be set normal to ground provided transition sections are constructed
4. Set in earth
  - a. Provide 36" deep concrete foundations
  - b. Circular foundations
    - 1) Terminal and gate posts diameter: Post OD plus 9"
    - 2) Diameter of all others: 10"
  - c. Firmly tamp ground around line posts where not set in concrete
    - 1) One of every 5 line posts must be set in concrete
  - d. Extend concrete above grade surface and crown 1"
  - e. Cure foundations 72 hours minimum before doing further work on post
  - f. Provide terminal post at each change in slope
  - g. Install all corner, end, pull and gate posts and every fifth line post in concrete

### C. Top Rails and Tension Wire

1. Install before fabric
2. Top rail minimum length: 18'
3. Securely connect top rail at gate and terminal posts
4. Install top rail on two chain link segments, each side of all angle points
5. Tension wires
  - a. Install on top and bottom of fabric
  - b. 6" above grade
  - c. Attach to each post
  - d. Securely anchor to each terminal and gate post
6. Install in accordance with CDOT M-Standard M-607-2

### D. Bracing

1. Provide for fences 6' or more high
2. Brace each terminal, gate, and pull post by a horizontal pipe brace and an adjustable tie rod extending to adjacent line post
3. Brace corner posts in both directions
4. Brace line posts so straight run between braced posts is not more than 500'

### E. Fabric

1. Attach to top rail and tension wire at 24" centers
2. Attach to line posts at 15" centers
3. Fasten barbed wire to extension arms by internal clips or external fabric ties
4. Provide stretcher bars at each gate, terminal, and pull post

- a. Thread through fabric
  - b. Anchor to post at 15" center by positive mechanical means
- 5. Adjust fence grade where necessary to fit ground contours by slipping fabric links
- 6. Stretch fabric taut and anchor so a pull of 150 pounds at the middle of a panel lifts the fabric no more than 6"
  
- F. Painting: Paint all surfaces of aluminum in contact with concrete, mortar, or dissimilar metals with a heavy coat of coal tar paint
  
- G. Barbed Wire
  - 1. Three (3) strands of barbed wire on 45° extension arms
  - 2. Three (3) strands of barbed wire on gates mounted vertically to the top of gate
  
- H. Digital Ingress/Egress Keypad
  - 1. Mount keypad 48" above ground surface
  - 2. Attach keypad to flange plate on gooseneck pedestal placed in concrete pad (AAS 18-001 or equal)
  - 3. Keypad face mounted to be 12" off edge of driving surface
  
- I. Interior Master Station
  - 1. Placed at location as directed by District staff in Operations facility
  - 2. Install in accordance with manufacturer's recommendations
  - 3. Hard-wire master station to keypad with appropriate wire gage as determined by manufacturer's recommendations

### 3.3 SCHEDULE

- A. Fence
  - 1. Galvanized steel
  - 2. 6' high
  - 3. 3 strands of barbed wire
    - a. On 45° extension arms
    - b. Top wire strand 1' out from and 1' above top of fence fabric
  - 4. Top and bottom tension wire
  - 5. All corner, end, pull, gate, and every fifth line post set in concrete
  - 6. Top rail at 20' each side of vertical or horizontal alignment at maximum 400' intervals
  
- B. Gates
  - 1. Slide gate – Entry Gate 1
    - a. Location as shown on the Drawing
    - b. Clear opening: 24'

2. Swing gate – SG-1
  - a. Location: Well access gate as shown on the Drawings
  - b. Number of leaves: Single leaf
  - c. Clear opening: 12'
3. Swing gate – SG-2
  - a. Location: Effluent discharge line at southeast corner of site as shown on the Drawings
  - b. Number of leaves: Single leaf
  - c. Clear opening: 12'

END OF SECTION