SECTION 32 31 13.43
CORRECTIONAL CHAIN LINK FENCING AND GATES

##### BASED ON DFD MASTER SPECIFICATION DATED 10/01/12

This section has been written to cover most (but not all) situations that you will encounter. Depending on the requirements of your specific project, you may have to add material, delete items, or modify what is currently written. The Division of Facilities Development expects changes and comments from you.

***This section is intended for use where fencing is to be installed or replaced at correctional institutions. Before using on a specific project, review the contents of this section with correctional institution staff. Modify the document to account for project specific conditions***

**P A R T 1 - G E N E R A L**

**SCOPE**

The work under this section shall consist of providing all work, materials, labor, equipment, and supervision necessary to provide a fully functioning fence and gate installation as provided for in these specifications and on the drawings. Work shall include but is not necessarily limited to the furnishing and installation of all metal chain-link fencing, posts, gates, gate operators, accessories, razor ribbon (concertina), crash beams and testing as shown on Drawings and/or specified herein, including all fittings, anchors, fasteners and components required for a complete and proper installation. Included are the following topics:

PART 1 - General

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Related Work
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Provisions for Future

Quality Assurance

Submittals

Warranty
Record Drawings

PART 2 - Materials

General
Fence Height
Framework
Fabric

Vehicle Sallyport Security Gates

Vehicle Gate Operators
Fabric Fasteners
Gates
Gate Hardware
Post Tops
Barbed Wire

Concertina
Tension Wire
Stretcher Bars
Ground Rods
Concrete

PART 3 - Execution

Site Work
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Posts and Braces
Post Bracing Assembly
Stretcher Bars
Ground Rods
Fabric
Grade Clearance
Gates
Barbed Wire
Concertina
Cleanup

**RELATED WORK**

Applicable provisions of Division 1 govern work under this Section.

00 00 00 – (Section Title)

00 00 00 – Concrete

31 20 00 - Earthmoving

***Add references to Division 11 for detention hardware or other divisions as necessary***

REFERENCES

Security fencing and gates shall conform to the following references:

 ASTM A123 Standard Specification for Zinc Coating on Iron and Steel Products

 ASTM A153 Standard Specification for Zinc Coating on Iron and Steel Hardware

 ASTM A392 Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric

 ASTM A491 Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric

 ASTM A824 Standard Specification for Metallic-Coated Steel Marcelled Tension Wire

 for Use with Chain Link Fence

 ASTM F626 Standard Specification for Fence Fittings

 ASTM F1043 Standard Specification for Strength and Protective Coating on Metal

 Industrial Chain Link Fence Framework

 ASTM F1083 Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized)

 Welded, for Fence Structures

 ***The following may be incorporated if the installation is in a corrosive environment, if the***

 ***product is used or if the A/E feels it is necessary.***

 ASTM A121 Standard Specification for Zinc-Coated Steel Barbed Wire

 ASTM A585 Standard Specification for Aluminum-Coated Steel Barbed Wire

 ASTM B117 Standard Test Method of Salt Spray (Fog) Testing

 ASTM F900 Standard specification for Industrial and Commercial Swing Gates

 ASTM F1184 Standard Specification for Industrial and Commercial Horizontal Slide Gates

 ASTM F1379 Standard Terminology Relating to Barbed Tape

#### CONTINUITY OF EXISTING SECURITY FENCING

Discuss the interruption of any security fencing with the security and maintenance personnel of the institution to determine how interruptions can best be made with minimum disruption. If work is required outside of regular work hours, this must be indicated in the specifications and/or working drawings. Add specifics regarding locations, hours, lengths of disruption, etc.

Do not interrupt or change existing security fencing without prior written approval from the correctional center. When interruption is required coordinate schedule with the correctional center to minimize disruptions. Unless specifically stated, all work involved in interrupting or changing existing security fencing is to be done during normal working hours.

**OWNER FURNISHED MATERIALS**

***This article is intended to alert the Contractor that the Owner will be furnishing some equipment or materials that will have to be received, stored, installed and/or which will need final connection for the completed project. In some cases, it may be appropriate to refer to other sections for a more complete description of the equipment being furnished or the work involved in installation.***

#### PROVISIONS FOR FUTURE WORK

***Explain what future extensions, options, or additions to the currently proposed work may need to be preserved by the contractor in this work.***

##### QUALITY ASSURANCE

Provide chain link fences, posts and gates as complete units. Each component to be furnished by a single supplier. Installation, including fencing materials, excavation, concrete and backfill, shall be a single contractor.

The manufacture of the gate operators shall be a company specializing in the manufacture of security gate operators of the type specified, with a minimum of five years experience with gate operators. The installer of gate operators shall have a minimum of three years experience installing similar equipment and approved by the manufacturer.

The following statement generally is not included, as it is very expensive to buy manufactured crash beams [barrier gates] with motorized operators. The A/E has been detailing them as custom work for manual operation [no motors]. The general contractor then builds them as part of their general construction.

The manufacturer of the crash beam shall be a company specializing in the manufacture of security crash gates of the type specified, with a minimum of five years experience with crash gates. The installer of the crash gates shall have a minimum of three years experience installing similar equipment and approved by the manufacturer.

SUBMITTALS

The following paragraph is not necessary if adequately detailed on the A/E plans. Adequate detailing is the preferred method.

Design

Fence layout and installation and installation drawings for review prior to fabrication and delivery. Provide detailed information and specifications for all products and provide finished dimensions and erection instructions. Indicate hardware locations and electrical connections/wiring diagrams for all electrical connections.

Product Data

Submit manufacturer’s technical data and installation instructions for metal fencing, framework, gates, razor ribbon and gate operators. Provide detailed information and specifications for all materials, including test and performance reports.

Shop Drawings

Comply with all requirements of the General Conditions, related specifications sections, and the drawings, and indicate layout, arrangement, dimensions, materials, finishes, fabrication, assembly and erection details; sizes of all members, fastenings, supports, anchors, patterns, clearances, and all necessary connections to work of other trades. Provide shop drawings showing complete assembly for combinations of manufacturer’s items as detailed. Coordinate hardware for each gate; verify lock mounting with detention equipment supplier and show mounting height and configuration. Shop drawings that do not conform to the above requirements will be rejected.

Fence Panel Test Results

Each fence panel shall be constructed such that it will pass the following tests: Deflection of fence fabric shall be no greater than 2 inches when a force of 30 lbs. is applied to the center of the panel, perpendicular to the plane of the fence fabric. Fabric shall return to its original position when the force is released.

The following two subsections are sometimes included in the specifications.

Certification

Manufacturers shall furnish a certification of compliance, stating that the material is in accordance with these specifications.

Samples

Specimens shall be taken from material lots and submitted as follows:

 Fabric, 12 x 12 inch square sample of each type and size.

 Post, one 12-inch sample of each type and size.

 Post Top and/or Extension Arms, one sample of each type and size.

##### WARRANTY

For the gate operators and crash gates, provide a five-year warranty against all defects in material or workmanship. Defective materials shall be replaced with new materials furnished by the manufacturer, at no cost to the Owner. Labor and other incidental costs that are not covered under the factory warranty shall be covered by the installer at no cost to the Owner for a period of one year after substantial completion.

**RECORD DRAWINGS**

Maintain record drawings of all fencing installations and points of connection made as part of this project and for future connection on original drawings prepared by the installing contractor/subcontractor. Include copies of record drawings with the Operating and Maintenance instructions.

**P A R T 2 - M A T E R I A L S**

**GENERAL**

All materials furnished shall be new materials unless otherwise specified. Salvaged materials may be used only when specified.

For work at correctional facilities, aluminum base materials shall not be used.

All accessories shall be zinc-coated in accordance with ASTM A123.

**FENCE HEIGHT**

The height of the fence shall be as shown on the plans or specified. For repair or replacement work, fence height shall match the existing fence. The designated height of the fence shall be the fabric height.

###### FRAMEWORK

Unless otherwise noted on the Drawings, exterior perimeter fence and internal security fence framework shall be constructed using Grade C, Schedule 80 steel pipe.

Unless otherwise noted on the Drawings interior perimeter fence and internal drift and control fences shall be constructed using Grade A, Schedule 40 steel pipe

Framework shall be hot-dip galvanized in accordance with ASTM F1083 and ASTM F1043, Group IC or Group II with B-D coating or better.

Framework pipe diameter and height shall be as indicated on the drawings. For repair or replacement work, fence height shall match the existing fence.

  ***The following is included if the Salt Spray Test is required.***

Performance, tubular framework shall meet the following performance in accordance with test method ASTM B117 (Salt Spray Test).

 Exterior: 1000 hours with a maximum of 5% red rust.

 Interior: 650 hours with a maximum of 5% red rust.

###### Terminal Posts and Pull Posts

Fabric Height Nominal Size Wall Thickness Weight per foot (lbs.)

12’ to 16’ 4” Grade B: .160 Grade B: 6.56

###### Line Posts

Fabric Height Nominal Size Wall Thickness Weight per foot (lbs.)

12’ to 16’ 2-7/8” Grade B: .160 Grade B: 5.71

###### Gate Posts for Swinging Gates

Gate Height (ft.) Gate Leaf Width

 6 ft. 8ft.

10’ to 14’ 4” 4”

###### FABRIC

Fabric shall conform to ASTM A392 Class 2 for zinc-coated wire or ASTM A491 Type I for aluminum-coated wire. Fabric Fasteners shall be in accordance with ASTM 626, High-Security Round Wire Ties and/or Interlocking Flat Wire Ties.

Provide fabric of gauge as follows:

* Exterior perimeter security fence: 6 gauge
* Interior perimeter security fence: 6 gauge
* ***If an electronic pulse type early warning/deterrent system is***
* Mounted on the interior fence, 9 gauge fabric may be used.
* Internal security fences: 9 gauge
* Drift fences: 9 gauge
* Pedestrian control fences: 9 gauge

Fence fabric 12’ high or less shall be constructed of a single sheet. Fences over twelve (12) feet in height may be of two piece construction.

***The following manufacturers and products are acceptable for corrections work.***

Vehicle sallyport gates are always a minimum of 14’ high to accommodate emergency vehicles

***and semi-truck delivery. The following gates have an overhead track and drive mechanism,***

***and they are used at medium-security institutions. Maximum-security institution are handled on***

***a case by case basis.***

###### VEHICLE SALLPORT SECURITY GATES

 Tymetal PLUSS Vehicle Sliding Gate Operator System with an Enclosed Drive Assembly

 Folger Adam Company Type J Sliding Fence Gate Operator

***For industrial type rail driven [non-overhead] horizontal sliding gates, the following***

***manufactures and products are acceptable for the gate operator. These operators are used for***

***minimum-security applications.***

###### VEHICLE GATE OPERATORS

Gate Operators: Model 222 SS-CF, by Hy-Security Gate Operators. Operator shall have the following options:

 Gate operators shall have the CF option components.

 For man gate at front entrance, provide a sensitive gate edge.

 Heater with thermostat control.

 Insulated and weather-stripped operator covers.

 Remote gate release devices.

Alternate gate operator manufacturers approved but subject to specification compliance:

 Stanley Door Systems

 International Controls and Equipment Co.

**FABRIC FASTENERS**

Provide fabric fasteners of steel wire clips and tie wires aluminum coated in conformance ASTM A-817 Type I.

Provide fasteners for posts, top and intermediate rails, bottom rails, top tension wires and braces of 9 gauge steel.

**GATES**

Provide additional horizontal and vertical members as necessary to assure proper gate operation and attachment to fabric and hardware.

Provide diagonal braces made of crossed adjustable length three-eight inch diameter truss rods on nonwelded gate frames and on welded frames where corner rigidity is not sufficient to prevent sag.

Gate frames shall be covered with the same fabric as the fence.

Weld or assemble gate frames with malleable or pressed steel fittings and rivets to provide rigid connections. Install fabric with stretcher bars at vertical edges. Attach to frame at fifteen (15) inches o.c. all sides. Provide caps for all gate frame work ends.

**GATE HARDWARE**

Provide heavy duty hinges of malleable iron, pressed or forged steel, nonlift-off type, adjusted to permit 180 degree gate opening. Provide two (2) hinges for each leaf.

Provide heavy duty forked type or plunger bar type latches for all single leaf gates. Provide center stop and keeper for all double leaf gates. Provide spring latch for all sliding gates. Provide padlock eye as an integral part of all latches.

Provide heavy duty track, ball bearing hanger sheaves framing and supports, guides, stays stops and bracing necessary for sliding gates.

# POST TOPS

Provide cast or malleable iron ornamental tops on all posts.

When shown on the plans, post tops shall be fitted with 45 degree extension arm for supporting three strands of barbed wire and with an opening for the top rail or tension wire. Extension arms shall be capable of supporting a 200 pound downward pull at the outermost end of the arm.

**BARBED WIRE**

Provide two (2) strand 12 1/2 gauge minimum barbed wire with 14 gauge minimum four (4) point barbs.

Galvanized wire shall conform to ASTM A-121, Class III.

Aluminum coated wire shall conform to ASTM A-585, Class II.

Aluminum alloy wire shall be 6061 conforming to ASTM B-211. Minimum tensile strength shall be 50,000 psi.

**CONCERTINA**

Provide double barbed tape product consisting of a 24 inch diameter fabricated from AISI 430 stainless steel with a minimum Rockwell hardness of 37. Barbs shall be in groups of 4 on 4 inch centers. Coil tapes shall be cold clenched around a stainless steel core wire having a minimum tensile strength of 220,000 psi.

Provide attaching clips of approximately 0.065 inch thick x 0.375 inch wide stainless steel, or 9 gauge stainless steel wire, or stainless steel hog rings, all capable of withstanding a pull of 200 pounds.

**TENSION WIRE**

Provide 7 gauge tension wire conforming to the fence fabric used, complete with end clamps. Tension wire shall conform to ASTM A824, Type I or Type II Class 3.

**STRETCHER BARS**

Provide stretcher bars of one piece lengths equal to the full fabric height with a minimum cross section of 3/16" x 3/4". Provide one (1) stretcher bar for each gate and end post and two (2) for each corner and pull post, except roll form posts with integral loops.

**GROUND RODS**

Provide a one-half inch diameter six (6) foot long copper clad rod to provide a ground. Provide one (1) for each 1,000' of fence and one for each separated fence section.

**CONCRETE**

All concrete for post base construction and anti-dig strips shall be Type CC concrete per Division 3.

**P A R T 3 - E X E C U T I O N**

**SITE WORK**

Prepare site for fence installation by grading surrounding area to finish grades. Account for topsoil, aggregate base and pavement.

Provide anti-dig strip as shown on the Drawings.

**FOOTINGS**

Excavate holes for footings to neat dimensions in firm ground to insure the post will be centered. Remove rock or other obstructions encountered to the required depth. Use forms in unstable soil and allow them to remain in place for at least twenty-four (24) hours after concrete is poured. Backfill, after forms are removed, with suitable material thoroughly compacted in place in layers to prevent settlement.

Unless otherwise shown on the Drawings, footings shall be four (4) feet deep and sixteen (16) inches minimum diameter. The bottom of the post shall be three (3) inches above the bottom of the hole. Any posts larger than four (4) inches old. shall have a base with a minimum diameter of eighteen (18) inches. Concrete bases shall be domed at the post and have a smooth toweled finish. Concrete footings shall cure for seven (7) days before placing tension wires.

**POSTS AND BRACES**

Set posts in a vertical position at the required location and alignment. Set tops at the required elevation to provide a smooth profile at the top rail or tension wire without abrupt changes and in conformity with the general contour and which meets the approval of the A/E.

Place an end post at each end of each run of fence. Place a corner post whenever a break of 30 degrees or more occurs in the horizontal alignment. Set an intersection post in line with an intersecting chain link fence and brace it to the adjacent posts of the intersecting fence.

Place an intermediate braced post where the vertical alignment changes by more than 5 degrees or a change in fence grade of more than nine (9) percent occurs.

Place an intermediate braced post at 660' intervals for fence with a top rail and at 1,000' intervals for fence with a top tension wire on all long runs of fence. Set an intermediate brace post at the approximate midpoint when runs of fence are less than 1,320' but more than 660' for fence with top rail, or less than 2,000' but more than 1,000' for fence with top tension wire.

Where driven posts are specified, all end, corner, gate and brace posts must be set in concrete. Driven posts shall be driven a minimum of thirty-two (32) inches into undisturbed soil.

**POST BRACING ASSEMBLY**

Post bracing assemblies consist of one (1) or more brace rails and a three-eighths (3/8) inch truss rod as hereafter specified. Provide brace rails the same size as the top rail. Provide truss rods with an adjustable take-up adapter.

Install a single bracing assembly at each gate and end post location.

Install a double bracing assembly at each corner post and all intermediate braced posts.

Provide the bracing assembly with one horizontal brace rail and one (1) diagonal truss rod on all fences which have a top rail. Locate the horizontal brace rail in accordance with the manufacturer's specifications.

Provide the bracing assembly with one horizontal brace rail and one diagonal brace rail and one diagonal truss rod on all fences which do not have a top rail. Locate the horizontal rail in accordance with the manufacturer's specifications.

**STRETCHER BARS**

Provide one (1) stretcher bar for each gate and end post and two (2) for each corner and pull post, except roll form posts with integral loops. Attach to posts with heavy duty pressed steel or malleable iron bands spaced at fifteen (15) inches o.c.

**GROUND RODS**

Connect at least three (3) fence wires to the ground rod by clamping, bolting or brazing. Ground rod shall be installed on line with fence.

Install ground rods as specified for each run of fence and install additional rods for each 1,000' on long runs of fence.

**FABRIC**

Install, stretch, and anchor tension wires to each end, corner, gate and brace post and properly attach to each line post before the fabric is placed. Pass top tension wire thru the post top rail opening. Install top, intermediate and bottom rails at proper locations.

Unless shown otherwise on the Drawings, hang fabric for perimeter fences on the secure side of the fenceline.

Attach the end of the fabric to the end, corner, gate or brace posts (except roll form posts with integral loops) by means of a stretcher bar threaded through the end loops of the fabric and stretched to remove all slack with proper stretching equipment. Secure the stretched fabric to posts, rails and tension wires with specified fabric fasteners. Install fabric fasteners on all posts at not greater than fourteen (14) inches o.c. and on rails at not more than twenty-four (24) inches o.c. Where a top tension wire is installed, fasten to the fabric at not more than eighteen (18) inches o.c. Install fabric fasteners in accordance with ASTM F626 High-Security Round Wire Ties and/or Interlocking Flat Wire Ties.

Repeat stretching operations at approximately every 100' for each run of fence.

For fabric installed on fences with fence height of 12’ or greater, make splices in fabric by interweaving a wire picket through each end loop of each piece of fabric. Each splice shall be subject to the A/Es approval.

**GRADE CLEARANCE**

For security fence installations, install the fence fabric with 1”clearance from the ground or pavement.

**GATES**

Install gates at locations shown on the Drawings. Provide gates and gate hardware of type and size indicated on the Drawings.

Install gates plumb and level and adjust for smooth operation as intended, without binding or hanging up.

**BARBED WIRE**

Install barbed wire as shown on the Drawings.

Properly fasten barbed wire to the rampart arms.

**CONCERTINA**

Install concertina in accordance with project drawings and manufacturer's recommendations. Clip, wire tie, or hog ring adjacent concertina coils together so as to form a concertina effect. Securely attach to tension wires, rampart arms, and fence fabrics so as to prevent audible noise to be generated from movement of the concertina by the wind and to assure a return of the concertina to its original position after disturbance.

**CLEANUP**

After chain link fence construction is completed clean up all storage and work areas. Replace or repair as required all landscape features damaged or disturbed under this contract.

END OF SECTION