

Part 1 General

1.1 SUMMARY

- .1 The work in this section shall include furnishing all labor, materials, equipment and appliances necessary to complete all enclosed drive motorized sliding gate(s) suited for detention applications and as required for this project in strict accordance with this section of specifications and drawings.
- .2 All detention motor box locks shall be shipped with a construction core and one key code for construction only. Installation contractor shall review specific key code requirements with facility to furnish facility specific lock cylinders, related lock hardware and keys to meet key code requirements.

1.2 RELATED INFORMATION

- .1 Refer to structural drawings for cast-in-place concrete.
- .2 Refer to electrical drawings for electrical requirements.
- .3 Refer to electrical drawings for interfacing with security electronic controls.

1.3 REFERENCES

- .1 American Welding Society
 - .1 AWS D1.1 / D1.1M Structural Welding Code
- .2 ASTM International
 - .1 ASTM A53/A53M-10, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A123, Standard Specification for Zinc (Hot-Dip galvanized) Coatings on Iron and Steel.
 - .3 A653/A653M-10, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .4 ASTM F1083, Standard Specification for Pipe, Steel, Hot-Dipped Zinc Coated (galvanized) Welded, for Fence Structures
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-138.1-96, Fabric for Chain Link Fence.
 - .2 CAN/CGSB-138.2-96, Steel Framework for Chain Link Fence.
 - .3 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
- .4 Underwriters Laboratory (UL)
 - .1 Underwriters Laboratory Gate Operator Requirements (UL 325)

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:

- .1 Include details of construction relative to materials, dimensions of individual components, and gate. Provide roughing-in diagrams, operating instructions, and maintenance information. Include the following:
 - .1 Setting drawings, templates, and installation instructions for built-in or embedded anchor devices.
 - .2 Motors: Indicate nameplate data and ratings; characteristics; mounting arrangements; size and location of winding termination lugs, conduit entry, and grounding lug; and coatings.
 - .3 Detailed description of operation.
- .2 Shop Drawings: For special components and installations not dimensioned or detailed in manufacturer's data sheets.
 - .1 Wiring Diagrams: Detail wiring for power, signal, and control systems. Differentiate between manufacturer-installed and field-installed wiring and between components provided by gate operator manufacturer and those provided by others.
 - .2 Foundation details for gate system.

1.5 CONTRACT CLOSEOUT SUBMITTALS

- .1 Refer to Section 01 78 00 – Closeout Submittals.
- .2 Operation and Maintenance Data for each Gate Type: Deliver 3 copies of instructions for operation, maintenance, recommendations, and parts manuals covering the installed products to the Departmental Representative. Include name, address and telephone number of nearest fully equipped service organization.

1.6 MAINTENANCE

- .1 Spare Parts: Furnish the following and store at the site where directed:
 - .1 Sliding Gate – Mechanical: One reduction gear assembly, one full-length chain and repair links and one crank handle.
 - .2 Sliding Gate – Electrical: one motor, two limit switches, four limit nuts, one relay overload, two relay motor OPEN/CLOSE-solid state, one transformer, one circuit board-VS, one disconnect switch 30 amp, thermostat, one status/limit switch and one heater gearbox immersion.
 - .3 Required amounts of recommended lubricants for 3 years of service.

1.7 CERTIFICATIONS

- .1 The steel factory welders must be certified per Article 2.1.1.2.

Part 2 Products

2.1 VEHICLE SLIDING GATE LOCKING SYSTEM

- .1 Manufacturer:
 - .1 Vehicle Locking System Manufacturer:

- .1 The Tymetal Corp., distributed by Strongbar Industries Inc., Mississauga, Ontario 800-661-5713 info@strongbar.com – Model PLUSS-10
 - .2 Or equal product by other manufacturer.
 - .2 Gate manufacturer shall provide independent certification as to the use of a documented Welding Procedure Specification and Procedure Qualification Record to insure conformance with the AWS D1.1 welding code. Individual Certificates of Welder Qualification documenting successful completion of the requirements of the AWS D1.1M code shall also be provided.
 - .3 Approved substitution – All other enclosed drive (three point mechanical locking) overhead sliding gate systems must be submitted to the design team in accordance with substitution requirements as set forth in the general provisions of the specification manual for approval not less than 14 calendar days prior to the bid date. Products submitted less than 14 calendar days prior to the bid date, or after the bid date will not be approved. Approved products must be published in addendum prior to bid date, verbal approval is not acceptable. Systems must meet enclosed drive requirements as out lined in Articles 1.1.1 and 2.1.2 through 2.1.8.
- .2 System Dimensions:
 - .1 Each overhead locking system shall have a clear opening height and clear opening width as shown on the detail drawings.
- .3 System Functions:
 - .1 System is designed to operate overhead sliding locking device.
 - .2 System shall be designed so that gate movement from the closed position is impossible except by electric or mechanical means.
- .4 Variable Speed-Rate of Travel:
 - .1 The vehicle locking system shall have the ability to achieve a maximum gate speed of 610 mm per second, and shall be equipped with soft-start and soft-stop function to prevent shock load to the gate panel and locking system. Gate speed shall be adjustable and as selected by the facility at the project site.
- .5 Motor:
 - .1 Motor Size: The electrical motor shall be 1 HP, 208VAC, 3 Phase as produced by a nationally recognized manufacturer.
 - .2 AC Drive: The variable frequency drive unit shall allow for programmable speeds and programmable soft-start and soft-stop features.
 - .3 Overload Protection: Motors shall be protected against overload by either a thermal or a current sensing overload device.
 - .4 Gear (Box) Reducer: The self-enclosed gear-head gearbox shall be manufactured as a single unit, and shall consist of hardened steel, machine cut worm and mating bronze gear running in oil bath. Oil shall be #634 specialty oil with a fluid pour point of –42 degrees C. The gearbox shall perform the following functions:
 - .1 Adjustable Clutching Device.
 - .1 If an obstruction is placed in the path of a gate, the operator must be capable of being stalled indefinitely without harming the

- device. On removal of the obstruction, the gate shall resume movement in the selected direction.
- .2 Whenever a door is stopped in any intermediate position, it shall be possible to manually move the door to the full open or full closed position and the door will automatically deadlock.
- .2 Manual disconnect by crank handle.
- .5 Gear Box Heater: Operator shall include internal gearbox heater and a heater strip for the control box.
- .6 Manual Operation: A crank handle, located at ground level in the motor box, shall provide a two-step emergency procedure for manual operation:
 - .1 Unlock and open motor-box door.
 - .2 Fold out handle and crank gate opened or closed.
- .7 Limits: The operator shall be equipped with an integral limit system, providing accurate settings to control the open and close positions of the gate, and shall not be affected by manual operation or motor removal.
- .8 Control Circuit: U.L. listed operator shall have 5v dc controls.
- .9 Control wiring: The electrical contractor shall supply all exterior control wiring.
- .10 Audio Alarm: This alarm shall have a dual function.
 - .1 The first function shall be as a warning prior to gate movement. When the motor control board recognizes a command, this alarm shall be activated three (3) seconds before the motor is energized and the gate begins to move. This shall be continuously activated while the gate is in motion.
 - .2 For UL Class IV operation only, the audio alarm shall be an entrapment notification alarm. This alarm shall sound as a result of a second activation of the external primary entrapment prevention device before an end limit (open or close) is reached. The pulsing rate of the alarm in the entrapment notification mode shall be faster than the pulsing rate when in the warning mode prior to gate movement.
- .11 Main Power Disconnect Switch and Wiring Compartment: When this switch is in the OFF position, the main power shall be disconnected from the Variable Speed Drive, Motor Control Board and power transformer(s).
- .12 Speed: The gate operator speed shall be fully programmable allowing a maximum speed of 610 mm per second.
- .13 Transformer: Operators shall have an isolated low voltage (24V) secondary circuit supplied by a Class II transformer (minimum of 40va) to provide separate power for external control devices.
- .14 Terminations: all terminations to be on terminal strips and to be labelled.
- .6 Motor Housing:
 - .1 Water Resistant Motor Box: The motor box shall be constructed of 10-gauge sheet steel, hot-dip galvanized per ASTM 123, gasketed and located at ground level for easy maintenance.
 - .2 Security Hinges and Tamper Resistant Security Screws: Security hinges and screws shall be furnished to secure operator enclosure components.

- .3 Motor Box Lock: Motor box shall be locked with a prison dead bolt. Three (3) paracentric keys shall be provided per construction key code as noted in specification Article 1.1.2.
- .4 Motor Box: Provide Open and Close switches inside box for maintenance of the sliding gate.
- .7 System Components:
 - .1 Track:
 - .1 Overhead track shall consist of two 254 mm structural steel channels joined together as shown on the drawings, weighing a minimum of 55kg/m.
 - .2 All individual welders shall be tested to conform with AWS D1.1 / D1.1M structural welding code - steel. The manufacturer shall provide individual qualification test records.
 - .2 Trolley: Heavy duty wheels shall be milled from a single block of hardened stainless steel and use 2 sealed ball bearings per wheel, 6 wheels per trolley.
 - .3 Bottom Guides: Bottom guides on plates: bottom guides shall be constructed of 9.525 mm x 63.5 mm flat steel, welded to a 6 mm x 127 mm x 254 mm steel plate, shall be lagged to the concrete footing or as otherwise specified for vehicle crash gates.
 - .4 Locking Column: The locking column is constructed of a W-5 "H" beam @ 101.6 mm x 19.3 kg/m with a removable steel cover, secured with security screws.
 - .5 Locking Tangs: Three locking tangs to be affixed to the leading edge of the gate panel to provide positive locking into the locking column.
 - .6 Posts: Double set of support posts shall be minimum 102 mm galvanized steel with concrete foundation as indicated on structural drawings.
 - .7 Drive Chain: Drive chain shall be #60 roller chain.
 - .8 Gate Guide Angle: Gate guide angle shall consist of a 63.5 mm x 38 mm x 6.4 mm steel angle attached to the bottom of the gate panel running its full length or as otherwise specified for vehicle crash gates.
- .8 Solid Gate Panel:
 - .1 Solid gate panel shall be manufactured with galvanized steel tube meeting the manufacturer's requirements. Gate frame shall be fabricated in two sections (top and bottom) and shall be field welded to form a single rigid panel.
 - .2 Outer Support Members: Galvanized steel tube 76 mm x 51 mm x 6.4 mm around perimeter of each half of solid gate panel.
 - .3 Inner Support Member: Galvanized steel tube 76 mm x 51 mm x 6.4 mm full height of the panel and spaced as shown on drawings.
 - .4 Top and bottom sections of the single East Gate panel shall be connected by a sleeve factory welded to the inside of each vertical tube of the upper section, and fitting tight into the inside of each vertical tube of the lower section. Sleeve to extend 102 mm into the upper and lower section tubes.

- .5 Solid Gate Panel Faces: Face sheets to be 12 gauge galvanized sheet steel secured to both sides of panel frame with steel rivets 305 mm O/C max. Fabricate each sheet to overlap support members by 51 mm.
- .6 Provide access ports in face sheets to allow for installation and adjustment of hanger bolts. Access port covers to be 12 gauge galvanized sheet steel secured at all corners with Torx-with-pin security screws.
- .9 Chain Link Panel:
 - .1 Chain link gate panel shall be manufactured with galvanized steel tube to ASTM A53/A53M and meeting the manufacturer's requirements.
 - .2 Outer Support Members: Galvanized steel tube 73 mm outside diameter around perimeter of chain link panel.
 - .3 Inner Support Member: Galvanized steel tube 73 mm outside diameter and spaced as shown on drawings.
 - .4 Chain Link Gate Panel Fabric: refer to Section 32 31 13 – Chain Link Fences and Swing Gates.
 - .1 Height of fabric: as indicated.
 - .2 Tension bars: refer to Section 32 31 13 – Chain Link Fences and Swing Gates.
 - .5 Chain Link Fence Fabric Curved Galvanized Steel Clips (for fastening chain link fence fabric to inner supports, top and bottom framing members): refer to Section 32 31 13 – Chain Link Fences and Swing Gates.
- .10 Concertina: refer to Section 32 31 13 – Chain Link Fences and Swing Gates.
- .11 Barbed wire: refer to Section 32 31 13 – Chain Link Fences and Swing Gates.
- .12 Fittings and hardware for chain link fence and concertina installation: refer to Section 32 31 13 – Chain Link Fences and Swing Gates.
- .13 Galvanized steel arms with integral post top combination: refer to Section 32 31 13 – Chain Link Fences and Swing Gates.
- .14 Custom galvanized steel arms: for mid-point support of concertina above gate clear opening of south sallyport chain link panel gate. Design to suit. Submit shop drawing for approval.
- .15 Galvanizing Touch-up Paint: refer to Section 32 31 13 – Chain Link Fences and Swing Gates.

2.2 CONTROLS

- .1 Supervised Application – Constant Pressure:
 - .1 Vehicle Sallyport Gate(s): Constant pressure on the pushbutton control, with the gate in site, is required as a primary entrapment protection device to keep the gate in motion. When the pushbutton is released, the gate will stop. The secondary entrapment device shall be the inherent audio alarm. An auto-close timer shall not be used with constant pressure push button controls.
 - .1 Automated gates will need to be set up for maintained contact. Operator in guardhouse with need to hold contact during the complete open and

closed cycle for the gate to move continuously from fully closed to fully open and again from fully open to fully closed (secure). If the operator removes this contact from the touch screen during gate movement the gate will stop in place and not re initiate movement until the contact to the touch screen is restored. Operator should be in full view of the gate while the contact is maintained on the touch screen and the gate is in motion.

2.3 FINISH

- .1 Galvanizing:
 - .1 All exposed system parts shall be zinc galvanized or as otherwise specified, to include color coating.

Part 3 Execution

3.1 SITE INSPECTION

- .1 Coordinate with other trades for conduit placement prior to pouring of foundation concrete or paving.
- .2 Final grades and installation conditions shall be examined. Installation shall not begin until all unsatisfactory conditions are corrected.

3.2 INSTALLATION

- .1 Equipment in this section shall be installed in strict accordance with the company's printed instructions unless otherwise shown on the contract drawings.

3.3 SOUTH SALLYPORT INTERIOR GATE

- .1 The existing fence around the South Sallyport interior gate is to be modified to suit a new wider gate. Modifications to the existing fence are to match existing and to requirements of Section 32 31 13 – Chain Link Fences and Swing Gates. Patch and make good after the new gate has been installed. The exact location of the new wider gate is to be approved by the Departmental Representative. Refer to the drawings for further information on new gate requirements.
- .2 Secure chain link fence fabric to pipe gate framing with curved galvanized steel clips at 200 o/c max. Weld clips on non-patient side of fence. Touch-up welds with galvanizing touch-up paint as specified.
- .3 Installation Of Barbed Wire And Concertina:
 - .1 Install overhang tops and caps on sliding gate posts as indicated.
 - .2 Install barbed wire and concertina as indicated on the Drawings, reviewed shop drawings and as directed by the Departmental Representative in accordance with CSC standards and Section 32 31 13 – Chain Link Fences and Swing Gates.
 - .3 Install custom galvanized steel arms as per approved shop drawings.

3.4 TOUCH UP

- .1 Clean damaged surfaces with wire brush removing loose and cracked coatings. Apply zinc touch-up primer and finish coat.
 - .1 Pre-treat damaged surfaces according to manufacturers' instructions for zinc-rich paint.

3.5 FIELD QUALITY CONTROL

- .1 Preliminary System Test:
 - .1 Preparation: Adjust the complete system and then operate it long enough to assure that it is performing properly.
 - .2 Run a preliminary test for each system:
 - .1 Determine whether the system is in a suitable condition to conduct the acceptance test.
 - .2 Check and adjust equipment.
 - .3 Train facility personnel.
- .2 System Acceptance Test:
 - .1 Preparation: Notify the Owner's Representative at least three working days prior to the test so arrangements can be made to have a Facility Representative witness the test.
 - .2 Test each system function step by step.
 - .3 Supply all equipment necessary for system adjustment and testing.
 - .4 Test and Explain Safety Features:
 - .1 Each system feature and device is a separate component of the gate system.
 - .2 Ensure that all instructions for mechanical components, safety devices and the gate operator are available for everyone who will be using the gate system.
 - .3 The warning signs shipped with the gate operator must be installed in prominent position on both sides of the gate.
 - .5 Ensure the owner is clear with regard to the safety points concerning the basic operational guidelines of the safety features of the gate operator system. These safety points are listed in the operator manual and must be read prior to system use.
 - .6 Installer shall conduct an equipment training course for facility maintenance staff.
 - .7 Submit written report of test results signed by the installer and the Owner's representative.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A53/A53M-02, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A90/A90M-01, Standard Test Method for Weight of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
 - .3 A653/A653M-03, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .4 ASTM C618-03, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
- .2 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
 - .2 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.
- .3 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-138.1-96, Fabric for Chain Link Fence.
 - .2 CAN/CGSB-138.2-96, Steel Framework for Chain Link Fence.
 - .3 CAN/CGSB-138.3-96, Installation of Chain Link Fence.
 - .4 CAN/CGSB-138.4-96, Gates for Chain Link Fence.
 - .5 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
 - .6 CAN/CGSB-93.4-92, Galvanized and Aluminum-Zinc Alloy Coated Steel Siding Soffits and Fascia, Prefinished, Residential.
- .4 Canadian Standards Association (CSA International).
 - .1 CAN/CSA-A23.1/A23.2-00(August 2001), Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
 - .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CAN/CSA-G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel.

1.2 SUBMITTALS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Drawings to indicate all pertinent dimensions, connections, details, materials, finishes and all other information required to completely describe the chain link fence installation to this project.

1.3 HEALTH AND SAFETY

- .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Separate for reuse and recycling and place in designated containers Steel, Metal and Plastic waste in accordance with Waste Management Plan.
- .5 Place materials defined as hazardous or toxic in designated containers.
- .6 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.
- .7 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Departmental Representative.
- .8 Divert unused concrete materials from landfill to local facility as approved by Departmental Representative.
- .9 Unused paint or coating material must be disposed of at an official hazardous material collections site as approved by Departmental Representative.
- .10 Do not dispose of unused paint material into sewer system, into streams, lakes, onto ground or in any other location where it will pose health or environmental hazard.
- .11 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 MATERIALS

- .1 Concrete mixes and materials: in accordance with CSA-A23.1.
 - .1 Nominal coarse aggregate size: 20-5.
 - .2 Compressive strength: 20 MPa minimum at 28 days.
 - .3 Additives: fly ash to ASTM C618.
 - .4 20 Mpa, 50 to 80 mm slump, 6% air entrainment.
- .2 Chain-link fence fabric: to CAN/CGSB-138.1. Reuse existing salvaged fencing where possible.
 - .1 Type 1, Class A, heavy style, Grade 3, 50.8 mm diamond mesh, interwoven 4.8 mm (6 Gauge) wire diameter with twisted tight selvage at top and bottom.
 - .2 Height of fabric: as indicated.
- .3 Concertina: to CAN/CGSB-138.2, barbed type galvanized to CSC standards and the approval of the Departmental Representative. 20 x 0.5 mm clenched around a 2.5 mm

diameter spring steel galvanized core wire to form a concertina coil with a nominal exterior coil diameter of 710 mm. The coil, when installed, shall have a minimum diameter of 635 mm. The barbed concertina shall have a 20 mm long blade type barbs measured from tip to tip of the blade, and barb clusters shall be spaced approximately 45 mm on centre. The concertina shall be formed by clipping adjacent loops of single helical coils together at a minimum of three (3) points on the circumference. Clips shall be galvanized. The resulting coil, when stretched, shall form a cylindrical pattern. The loop spacing shall not exceed 230 mm.

- .4 Barbed wire: for concertina coil support at fence top, two barbed wires stretched and fixed to post arms shall be provided. Barbed wire shall consist of two strands of 12 gauge wire with 4 point barbs at 130 mm spacings, all galvanized.
- .5 Posts, braces and rails: to CAN/CGSB-138.2, galvanized steel pipe.
 - .1 Line (Intermittent) Posts: 73 mm O.D. standards continuous, galvanized, minimum 8.6 kg/m.
 - .2 Terminal Posts: End, swing gate posts, corner and straining posts, 150 mm O.D., galvanized, minimum 21.0 kg/m.
 - .3 Bottom and Top Rail: 42 mm O.D. galvanized pipe, plain ends random lengths, galvanized, minimum 3.4 kg/m.
 - .4 Intermediate rails shall not be used.
- .6 Chain Link Fence Fabric Curved Galvanized Steel Clips (for fastening chain link fence fabric to line posts, top rails and bottom rails): 38 mm long x 13 mm wide x 4.5 mm thick curved galvanized steel clips. See architectural drawing A1.3 for further details.
- .7 Tension bar: to ASTM A653/A653M, 5 x 20 mm minimum galvanized steel complete with 3 x 20 mm tie bands and 6 mm diameter zinc coated nuts and bolts with nuts welded to bolts or threads damaged after install to prevent removal of nuts. Touch up with galvanizing touch-up paint.
- .8 Galvanized steel arms with integral post top combination: shall be provided on all posts where concertina is to be installed as detailed and in accordance with CSC standards.
 - .1 Post top arms to provide waterproof fit.
 - .2 Galvanized steel post top arms to be welded to posts and touched up with galvanizing touch-up paint.
- .9 Sliding Gates: see Section 32 31 00 –Vehicle Sallyport Gates.
- .10 Fittings and hardware: to CAN/CGSB-138.2, cast aluminum alloy, galvanized steel or malleable or ductile cast iron. Turnbuckles to be drop forged.
- .11 All welded-in-place connections to be touched-up with galvanizing touch-up paint.
- .12 Grounding rod: 16 mm diameter copperwell rod, 3 m long.
- .13 Galvanizing Touch-up Paint: Make good corrosive protection after welding where burnt by welding operations and where removed to facilitate welding operations, using zinc touch-up primer conforming to CAN/CGSB-1.181-99 and finish coat. Use as per manufacturer's instructions.

- .1 Acceptable products:
 - .1 Primer Coat: Sprayon S00740 or equal.
 - .2 Finish Coat: Krylon Industrial Silver Zinc or equal.
- .14 Top rails to be in lengths of 5500 mm, and shall be fitted with couplings or swedged for connecting the lengths into a continuous run. The couplings shall be not less than 152 mm long, with 2.0 mm minimum wall thickness, and shall allow for expansion and contraction of the rail.
- .15 Sleeves for horizontal rails shall allow for expansion and contraction. Sleeves to be 2.0 mm minimum wall thickness. Sleeves to be securely fastened to posts.

2.2 FINISHES

- .1 Galvanizing:
 - .1 For chain link fabric: to CAN/CGSB-138.1 Grade 2 610 g/m² minimum .
 - .2 For pipe: 550 g/m² minimum to ASTM A90.
 - .3 For other fittings: to CAN/CSA-G164.

Part 3 Execution

3.1 GRADING

- .1 Remove debris and correct ground undulations along fence line to obtain smooth uniform gradient between posts.
 - .1 Provide clearance between bottom of fence and ground surface of 30 mm.

3.2 ERECTION OF FENCE

- .1 Erect fence along lines as indicated and to CAN/CGSB-138.3.
- .2 Install line, straining and corner posts plumb, set in concrete footings as follows:
 - .1 Line posts, straining, swing gate, corner & end posts:
 - .1 Concrete depth: 1800 mm
 - .2 Diameter at Top: 400 mm
 - .2 Ensure top of concrete piles are concave sloping away from the fence post to the outer edges of the pile.
 - .3 Ensure top edge of concrete pile is minimum 25mm above adjacent asphalt surface.
- .3 Place concrete in post holes then embed posts into concrete to depths indicated. Where bedrock is encountered within embedment length, extend 600mm into bedrock and grout solid with non-shrink grout. Extend concrete 50 mm above ground level and slope to drain away from posts. Brace to hold posts in plumb position and true to alignment and elevation until concrete has set. Ensure posts are centred in post holes.
- .4 Space line posts maximum 2.4 m apart, measured parallel to ground surface.

- .5 Install additional straining posts at sharp changes in grade and where directed by Departmental Representative.
- .6 Install corner post where change in alignment exceeds 10°.
- .7 Install end posts at end of fence and at buildings. Install swing gate posts on both sides of swing gate openings.
- .8 Do not install fence fabric until concrete has cured minimum of 5 days.
- .9 Install brace between end and swing gate posts and nearest line post, placed in centre of panel and parallel to ground surface. Install braces on both sides of corner and straining posts in similar manner.
- .10 Install galvanized steel arms with integral post top combination. Weld in place and touch-up with galvanizing touch-up paint.
- .11 Install top and bottom rail between posts. Secure top rail to posts through post top holes and bottom rail to post sleeves. Ensure expansion and contraction is provided for top and bottom rails.
- .12 Lay out fence fabric. Stretch tightly to tension recommended by manufacturer and fasten to end, corner, swing gate and straining posts with tension bar secured to post with tension bar bands spaced at 300 mm intervals. Ensure distance between tension bar and posts does not exceed 13 mm. Tight twisted selvedge at top and bottom.
- .13 Secure fabric to line posts, top rails and bottom rails with curved galvanized steel clips at 200 o/c max. Weld clips on non-patient side of fence. Touch-up welds with galvanizing touch-up paint as specified.
- .14 Install grounding rods as directed by the Departmental Representative.
- .15 Install barbed wire and concertina as indicated on the Drawings, reviewed shop drawings and as directed by the Departmental Representative in accordance with CSC standards.

3.3 INSTALLATION OF SLIDING GATES

- .1 See Section 32 31 00 – Vehicle Sallyport Gates.

3.4 TOUCH UP

- .1 Clean damaged surfaces with wire brush removing loose and cracked coatings. Pre-treat damaged surfaces according to manufacturers' instructions for touch-up paint.

3.5 CLEANING

- .1 Clean and trim areas disturbed by operations. Dispose of surplus material as directed by Departmental Representative.

END OF SECTION