



Part 1 General

1.1 DESCRIPTION OF WORK

- .1 The work shall consist of the supply and construction of a chain link fence, barb wire fences or mesh fences as shown on the Plans or as specified in Section 01001, Special Provisions.

1.2 STANDARDS

The following organizations publish Standards which have been referred to in this Section:

- .1 CSA International,
178 Rexdale Boulevard,
Toronto, Ontario M9W 1R3
- .2 ASTM – American Society for Testing and Materials
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959 USA

The Standards referred to shall be the most recent edition.

Part 2 PRODUCTS

2.1 CHAIN LINK FENCE

- .1 The fence shall be 1.80m high, as shown in the chain link fence detail on pages 9 and 10, of this section or as otherwise shown on the Plans.
- .2 The chain link fabric shall be in accordance with current CAN2-138. 1-M, Type 1, Class A, Medium Style. The fabric shall consist of chain link 2.8 mm (No.9 gauge) steel wire, galvanized after weaving by a hot process. The wire shall be woven to a 51 mm mesh. The top and bottom salvage shall have a knuckle finish.
- .3 The posts or pickets shall have a minimum tensile strength of 207 MPa and shall be comprised of standard butt-welded galvanized pipe with an outside diameter of 60 mm. The length shall be 840 mm greater than the height of fabric. The minimum mass per metre shall be 5.4 kg.



- .4 Terminal posts shall be in accordance with current CAN2-138.1-M. The end corner and straining posts shall consist of 89 mm outside diameter standard butt-welded galvanized pipe. The length of the end posts shall be 1.38 m greater than the height of the fabric. The length of corner and straining posts shall be 1.06 m greater than the height of the fabric. The minimum mass per metre shall be 11.1 kg.
- .5 Gate posts shall consist of standard butt-welded pipe galvanized as per ASTM Standard A 120, and current CAN2-138.2-M, Black and Hot Dipped Galvanized Welded and Seamless Steel Pipe for Ordinary uses with 89 mm outside diameter; the minimum mass per metre shall be 11.1 kg. The length shall be 1.38 m greater than the height of the fabric.
- .6 The top rail shall consist of standard butt-welded plain-end pipe in random lengths with a 45 mm outside diameter, galvanized as per ASTM Standard A 120. Minimum mass per metre shall be 3.37 kg. Galvanized couplings, galvanized in accordance with ASTM Standard A 120 shall be of outside sleeve type and shall be used where necessary to join the top rail. These couplings shall be not less than 178 mm in length.
- .7 Bracing shall consist of the same type of material as that used for the top rail (See Clause 2.1.6).
- .8 All fittings shall consist of pressed steel, cast aluminium alloy, malleable iron or cast iron. They shall be hot-dipped galvanized in accordance with ASTM Standard A 120. Post caps shall provide a waterproof fit, to fasten securely over posts and to carry the top rail.
- .9 The fabric bands shall consist of galvanized steel, in accordance with ASTM Standard A 120.
- .10 Tension wire shall consist of galvanized single strand 3.4 mm diameter (No. 6 gauge) wire of good commercial quality. Galvanizing shall be in accordance with ASTM Standard A 120.
- .11 Fasteners shall be 5 mm diameter single strand galvanized steel wire conforming to requirements of fence fabric.
- .12 Tension bars shall be 5 x 20 mm minimum galvanized steel. Tension bar bands shall be 3 x 20 mm minimum galvanized steel.
- .13 Unless otherwise noted on the plans, gates shall be double swing, 3.05 m opening gates, each leaf to be 1.52 m. The frames of the gates shall be of the same material



as the top rail. The units shall be welded at all joints and hot-dipped galvanized after welding, in accordance with ASTM Standard A 120. Gates shall come equipped with galvanized malleable iron hinges, latches and latch catches. Each gate shall have a centre rest with a drop bolt for the closed position and a chain.

Gate latches shall be suitable for padlocks which can be attached and operated from either side of the gate. The hinges shall permit each gate to swing back against the fence 180 degrees if required. Gate braces where required shall be 33 mm outside diameter steel pipe galvanized in accordance with ASTM Standard A 120

2.2 **BARB WIRE FENCE**

- .1 Height of fence shall be minimum 1.2 metres as shown on the Barb Wire Fence detail on page 11 of 12 of this Section.
- .2 Barbed wire: to ASTM A121-07
 - .1 Galvanized steel
 - .2 Wire size: 12 gauge double strand
 - .3 Barbs: 4 point at 125 mm spacing
- .3 Entrance Gate
 - .1 Install a double swing entrance gate assembly, each leaf to be one half the total gate width (5 metres total) at the location shown on the Plan.
 - .2 Frame – standard butt-weld plain-end pipe with a 45 mm outside diameter, galvanized as per ASTM Standard A 120. Minimum mass per metre shall be not less than 3.37 kg. Weld units at all joints and hot-dipped galvanize after welding, in accordance with ASTM Standard A 120. Equip gates with galvanized malleable iron hinges, latches and latch catches. Provide a centre rest with a drop bolt for the closed position and a chain “hold open”.
 - .3 Fabric – Galvanized steel wire shall be made to current ASTM 392. The fabric shall consist of electro welded fabric minimum 3.5 mm diameter (No. 12 gauge) steel wire, galvanized after welding or tight lock process. Mesh fence type to be 10/60/6 knot game fence or equivalent. Minimum 1.2 metres in height.
 - .4 Latches - suitable for padlocks which can be attached and operated from either side of the gate. The hinges shall permit each gate to swing back against the fence 180 degrees if required. Provide gate stops c/w approved latching mechanism at both edges of roadway.



- .5 Gate stops: Provide approved hold open mechanism on both leafs of the gate.
- .4 Wood Posts
 - .1 Sound and straight.
 - .2 Intermediate posts to be installed a minimum 900 mm deep and minimum 90 mm diameter at small end.
 - .3 Corner, end, and anchor posts to be installed a minimum of 1200 mm deep and minimum 150 mm diameter at small end.
 - .4 Posts to be pressure treated in accordance with current CSA 080 Series.
- .5 Fence Bracing at Gate
 - .1 The fence bracing shall consist of 43 mm outside diameter standard continuous – weld schedule 40 hot dipped galvanized steel pipe.
- .6 Gate Posts
 - .1 The gate posts shall consist of 114.3 mm outside diameter standard continuous-weld schedule 40 hot dipped galvanized steel pipe.

2.3 MESH FENCE

- .1 All galvanizing as per ASTM Standard A 120.
- .2 Fence Fabric: Galvanized steel wire shall be made to current ASTM-A 392. The fabric shall consist of electro welded fabric minimum 3.5 mm diameter (No. 9 gauge) steel wire, galvanized after welding or tight lock process. Mesh fence type to be fixed knot game fence, 150 mm x 150 mm or equivalent. The height of the mesh fence shall be 1.5 metres.
- .3 Line Posts: Galvanized heavy weight round 43 mm (1 11/16 diameter with rain cap on top. The minimum mass per metre shall be 2.0 kg.
- .4 Terminal Post (end, corner and straining): 90 mm outside diameter standard continuous – weld schedule 40 hot dipped galvanized steel pipe. The length of the Terminal Posts shall be such that a minimum 700 mm is embedded into the concrete portion of the footing while maintaining all above ground dimension and spacing requirements. Minimum mass per metre shall not be less than 11.1 kg. Each terminal post shall be equipped with spiked ornamental fitting. No tubing, conduit or open seam material will be allowed.
- .5 Gate Posts: The gate posts shall consist of 90 mm outside diameter standard continuous-weld schedule 40 hot dipped galvanized steel pipe. Each gate post



shall be equipped with spiked ornamental fitting. The length of the Gate Posts shall be such that a minimum 700 mm is embedded into the concrete portion of the footing while maintaining all above ground dimension and spacing requirements. Under no circumstances shall a corner post also be a gate post.

- .6 Bracing: Standard galvanized 90 mm outside diameter butt-weld pipe. All fittings shall be galvanized and to consist of either pressed steel, malleable iron or cast iron.
- .7 The Fabric Bands: The fabric bands shall consist of galvanized steel.
- .8 Gates:
 - .1 Double swing type, 5 m opening gates, each leaf to be 2.5 m. minimum 1.2 m in height.
 - .2 Standard butt-weld, galvanized plain-end pipe in random lengths with a 45 mm outside diameter.
 - .3 Minimum mass per metre: not less than 3.37 kg.
 - .4 Weld all joints and hot-dipped galvanized after welding, in accordance with ASTM Standard A 120.
 - .5 Equip gates with galvanized malleable iron hinges, latches and latch catches. Provide a centre rest with a drop bolt for the closed position and a chain “hold open”. Mesh fence type to be fixed knot game fence.
 - .6 Latches – suitable for padlocks which can be attached and operated from either side of the gate. The hinges shall permit each gate to swing back against the fence 180 degrees if required. Provide gate stops (hold open mechanism) c/w approved latching mechanism on both leafs of the gate.
- .9 Caps: Pipe caps to be cast steel, hot dipped galvanized, sized to post diameter complete with through bolt retainer.

2.4 CONCRETE

- .1 Concrete to have 28 day strength of not less than 15 MPa.

Part 3 EXECUTION

3.1 CHAIN LINK FENCE

- .1 The fence shall be constructed in accordance with the lines and grades shown on the Plans. Gate openings shall be provided as indicated on the Plans. The diameter of the post holes shall not be less than 150 mm and not greater than 250



mm bored to the proposed imbedded depth of the post as indicated on the Plans. The posts shall be firmly placed in line in their respective holes and the holes shall be backfilled with concrete having a 28-day strength of not less than 15.0 MPa. The fence shall be properly tensioned to ensure that there is no sag or give, once erection is completed. All posts shall have a spacing not exceeding 3.05 m on centres.

- .2 Horizontal braces shall extend from the end, corner, straining or gate post to the nearest line post.
- .3 Steel fabric bands shall be used for fastening fabric to the top rail, straining post, corner posts and gate posts. Suitable wire ties shall be supplied. All ties to horizontal members shall be placed at approximately 450 mm intervals. All ties to vertical members shall be placed at approximately 300 mm intervals.
- .4 Tension wire shall be stretched taut along the bottom of the fabric; utilizing turnbuckles and tension wire bands.

3.2 BARB WIRE FENCE

- .1 Erect fence according to Specifications and barb wire fence details on page 11 of 12 of this Section.
- .2 Excavate post holes to dimensions indicated by methods approved by Engineer.
- .3 Installation of Post
 - .1 Space intermediate posts at 2.438 m on center.
 - .2 Space corner, end and gate posts maximum 2.5 m from adjacent pull post and brace with two diagonal wooden braces securely attached to each post.
 - .3 Locate and erect gate posts as indicated.
 - .4 Install posts true to line and plumb with minimum 1.2 m of post projecting above ground.
 - .5 Compact backfill around posts to same density as surrounding ground. Dispose of surplus excavated material as directed.
 - .6 Install braces at end, corner and gate posts. Join braces into posts and spike securely.
- .4 Erect wires and stretch to have uniform tension. Splice wires with standard wire splices.
- .5 Use 4 strands of 12 gauge double strand barbed wire 300 mm spacing affixed with galvanized steel wire staples, minimum 35 mm long. Staples shall be driven



downward and at an angle. The barbed wire shall be properly tensioned to ensure that there are no sags. Attach top wires to posts with minimum two staples. Fasten other wires to posts and cross braces with at least one staple. Staple wires securely at end, anchor and gate posts.

- .6 Install gate(s) in location(s) indicated on plans or where directed by Engineer.
 - .1 Fence bracing for the gate shall be bolted to the gate post and the first wood post in cross-bracing manner with 20 mm diameter galvanized bolts complete with two galvanized washers and galvanized nut.
 - .2 Install gate(s) on posts in a manner to prevent overstress on gate posts anchored.
 - .3 Determine location of anchor pipe for drop bolt and drive pipe flush with road surface.
 - .4 Construct the gate level to provide a gate that swings and operates in a good working manner.

3.3 MESH FENCE

- .1 Build fence to the line and grades shown on the Plans and the mesh fence detail on page 12 of this Section. Install line posts, corner posts, top rails, and post caps to provide a rigid structure, fabric and gates. Use manufacturer's standard fittings, fasteners and hardware.
- .2 Maximum spacing of posts is 3 m on centre. The maximum spacing between terminal posts (end, corner and straining) shall not exceed 150 metres.
- .3 Install line and corner posts plumb and in a set alignment. Set in concrete footing as indicated on the Plans.
- .4 Do not utilize line posts preceding any gate post.
- .5 Do not utilize a corner type post preceding a gate post.
- .6 Do not utilize a corner post as a gate post.
- .7 Set terminal, gate and corner posts to within 200 mm from bottom of concrete footing or as indicated on the Plans, install tamped excavated material into top 900 mm of bore hole above concrete footing. Set top of tamped backfill material at ground elevation.
- .8 Position bottom of fabric 50 mm +/- 25 mm above finished grade.



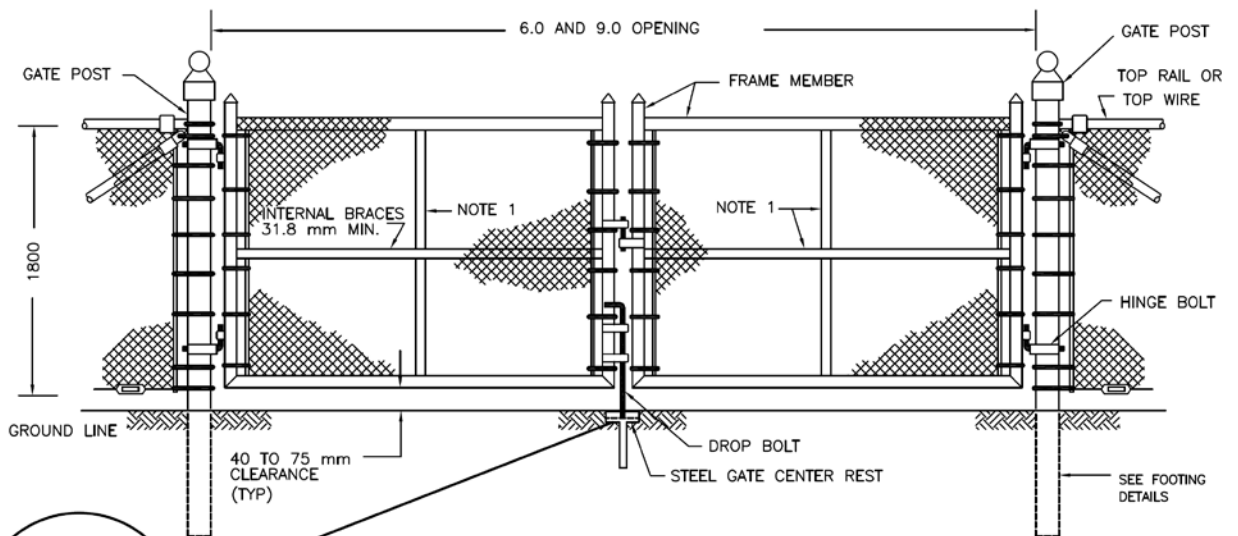
- .9 Pass bracing through corner type post preceding gate post and gate post to form rigid bracing. Install 175 mm long couplings midspan at pipe ends.
- .10 Brace each gate, corner and terminal post back to adjacent corner post with bracing. Install bracing, one bay from all end and gate posts.
- .11 Fasten fabric to line posts, braces and bands with wire clips maximum 300 centers. Attach fabric to end, corner and gate posts with tension bars and tension bar slips. Stretch fabric between terminal posts. The fence shall be properly tensioned to ensure that there is no sag or give once erection is completed.
- .12 Splice fabric by untwisting strands and re-twisting to join fabric ends.
- .13 Do not bend fabric around corners. Cut, stretch and tie at corner end or gate posts.
- .14 Start new fabric at each corner post or grade change.
- .15 Install gates of sizes shown using fabric to match fencing. Install three hinges, leaf, latch, catches, and lock.
- .16 Set gate bottom approximately 250 mm above ground surface.
- .17 Level gate throughout its swing and ensure it swings freely.

3.4 TOUCH UP

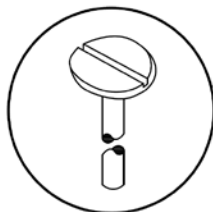
- .1 For chain link and mesh fences, the Contractor shall repair damaged galvanized surfaces by cleaning them with a wire brush to remove loose and cracked spelter coatings and applying two coats of approved zinc rich paint.

3.5 RESTORATION

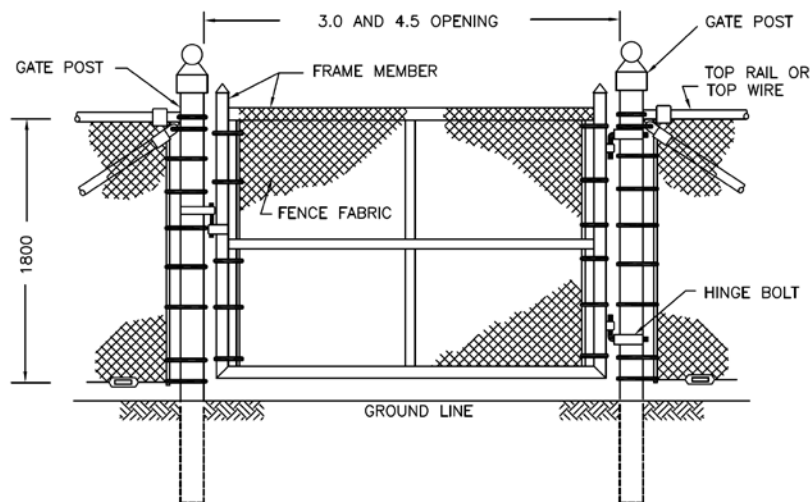
- .1 The Contractor shall re-level the ground underneath the fence and around posts to a consistent neatly trimmed appearance.



DOUBLE SWING GATE OPENING



STEEL GATE CENTER REST



SINGLE SWING GATE OPENING

| GATE AND POST DETAILS | | | |
|--------------------------------|---------------------------|-----------------------|--------------------------|
| GATE TYPE AND MAX. OPENING (m) | FRAME MEMBER MIN. OD (mm) | POST DIA MIN. OD (mm) | POST LENGTH STANDARD (m) |
| SINGLE SWING 3.0 | 42.9 | 88.9 | 2.6 |
| DOUBLE SWING 6.0 | | | |
| SINGLE SWING 4.5 | 48.3 | 114.3 | 2.9 |
| DOUBLE SWING 9.0 | | | |

NOTES:

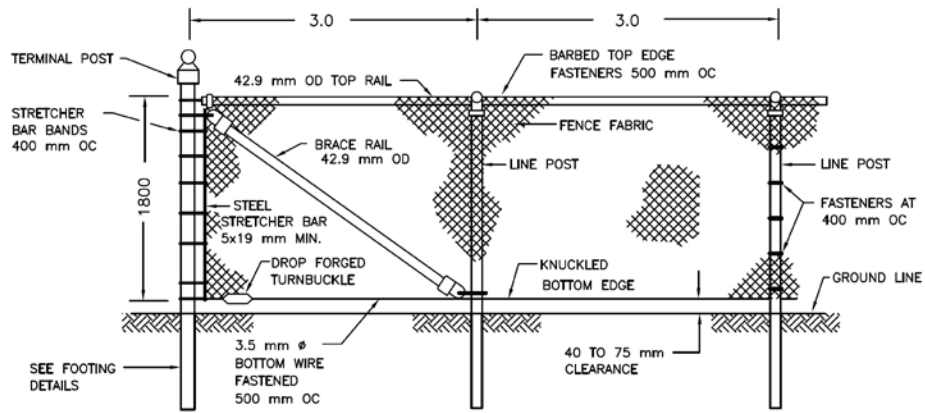
- GATE LEAVES GREATER THAN 3.6 m IN WIDTH ARE SUPPLIED WITH DIAGONAL BRACES

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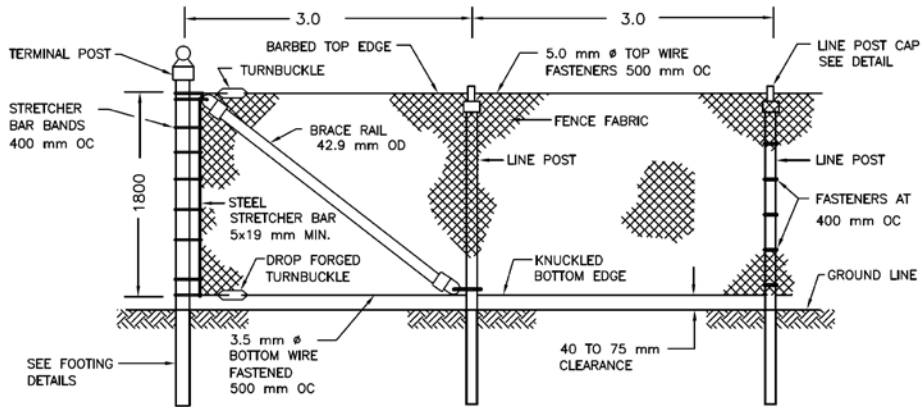
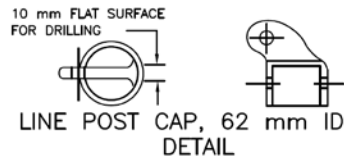
STANDARD CONSTRUCTION SPECIFICATIONS
THE MANITOBA WATER SERVICES BOARD
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CHAIN LINK FENCE

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CHAIN LINK FENCE WITH TOP RAIL

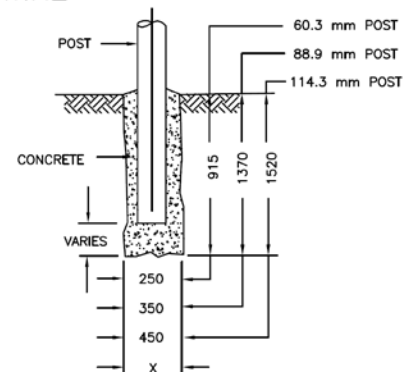


CHAIN LINK FENCE WITH TOP WIRE

NOTE:

A ALL DIMENSIONS ARE IN MILLIMETERS OR METERS UNLESS OTHERWISE SHOWN.

| POST TYPE | OD (mm) | POST LENGTH | | SLEEVES OD (mm) |
|--------------------------------|---------|--------------|---------------------|-----------------|
| | | STANDARD (m) | RETAINING WALLS (m) | |
| LINE POST | 60.3 | 2.6 | 2.0 | 88.9 |
| END, CORNER, OR STRAINING POST | 88.9 | 2.9 | 2.3 | 114.3 |



STANDARD CONSTRUCTION SPECIFICATIONS
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CHAIN LINK FENCE



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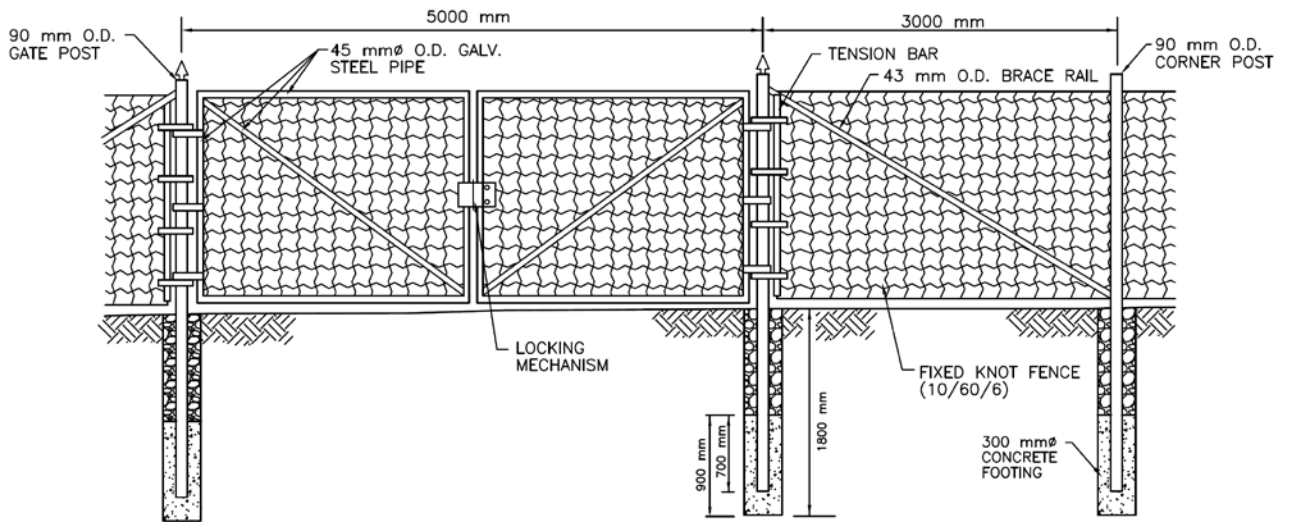
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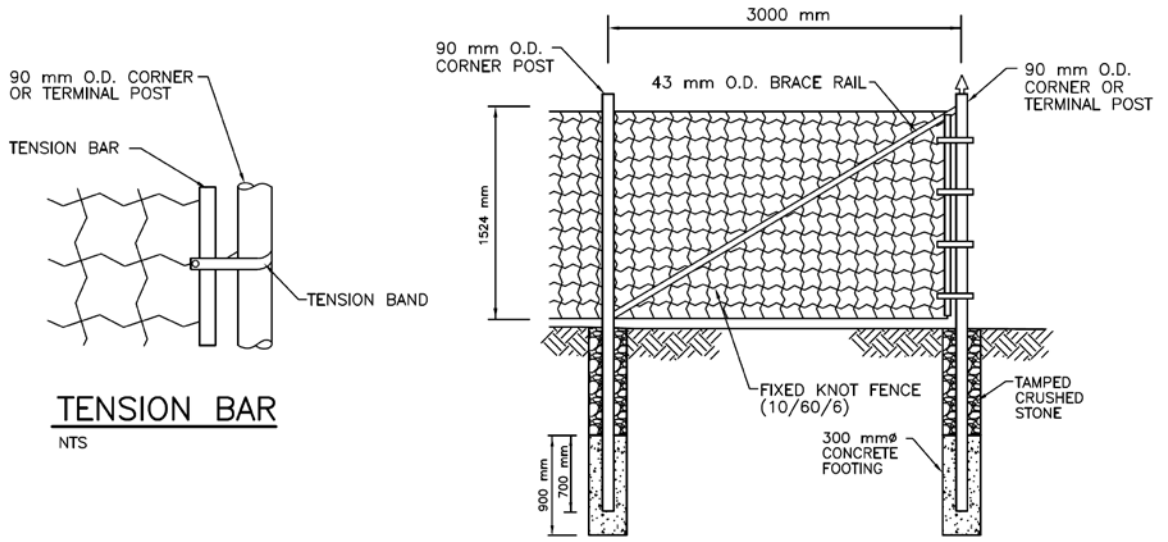
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ACCESS GATE DETAIL

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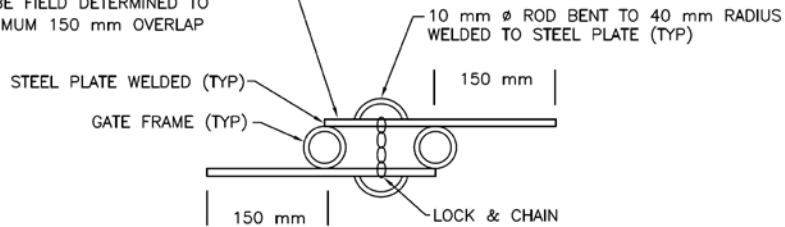
POST FOOTING
TOP OF CONCRETE FOOTING TO BE 0.90m BELOW GROUND SURFACE. FILL UPPER 0.90m WITH CRUSHED STONE TAMPED IN PLACE.



CORNER POST

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200 mm WIDE STEEL PLATE (7 mm THICK)
LENGTH TO BE FIELD DETERMINED TO
PROVIDE MINIMUM 150 mm OVERLAP



LOCK DETAIL

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MESH FENCE



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