

<b>1195 BOUNDARY FENCES FOR ROAD RESERVES</b>
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**1 GENERAL****1.1 RESPONSIBILITIES****Objectives**

General: Provide boundary fences for road reserves, as documented..

**Performance**

Requirements: Conform with drawings, this worksection, directions by the Superintendent all to conform with *0161 Quality (Construction)*.

**Design**

Designer: ~~[complete/delete]~~

Authority requirements: ~~[complete/delete]~~

**1.2 CROSS REFERENCES****General**

Requirement: Conform to the following:

- *0136 General requirements (Construction)*.
- *0152* Schedule of rates – supply projects.
- *0161 Quality (Construction)*.
- *0167 Integrated management*.
- *0319 Minor concrete works*.
- *1101 Control of traffic*.
- *1111 Clearing and grubbing*.
- *1192 Signposting*.

**1.3 REFERENCED DOCUMENTS****Standards**

General: The following documents are incorporated into this worksection by reference:

AS 1074 – 1989	Steel tubes and tubulars for ordinary service.
AS 1111	ISO Metric hexagon bolts and screws – Product grade C.
AS 1111.1 – 2000	Bolts.
AS 1111.2 – 2000	Screws.
AS 1112 – Various	ISO Metric hexagon nuts.
AS/NZS 1163 – 2009	Structural steel – Hollow sections.
AS 1214 – 1983	Hot-dip galvanised coatings on threaded fasteners (ISO metric coarse thread series).
AS 1237	Plain washers for metric bolts, screws and nuts for general purposes.
AS 1237.1 – 2002	General plan.
AS 1237.2 – 2002	Tolerances.
AS 1289	Methods of testing soils for engineering purposes.
AS 1289.5.6.1 – 1998	Soil compaction and density tests - Compaction control test - Density index method for a cohesionless material.
AS/NZS 1390 – 1997	Cup head bolts with ISO metric coarse pitch threads.
AS 1604 – various	Specification for preservative treatment.
AS 1720 – various	Timber structures.
AS 1725	Chain-link fabric security fencing and gates.
AS 1725.1 – 2010	Security fences and gates – General requirements.
AS 1725.2 – 2010	Tennis court fencing – Commercial.
AS 1725.3 – 2010	Tennis court fencing – Private/residential.
AS 1725.4 – 2010	Cricket net fencing enclosures.
AS 1725.5 – 2010	Sports ground fencing – General requirements.
AS 1742	Manual of uniform traffic control devices.
AS 1742.2 – 2009	Traffic control devices for general use.

AS 2082 – 2007	Timber – Hardwood – Visually stress – graded for structural purposes.
AS 2423 – 2002	Coated steel wire fencing products for terrestrial, aquatic and general use.
AS 2858 – 2008	Timber – Softwood – Visually stress – graded for structural purposes.
AS 3600 – 2009	Concrete structures.
AS/NZS 3750.9 – 2009	Paints for steel structures – organic zinc – rich primer.
AS/NZS 4680 – 2006	Hot-dip galvanised (zinc) coatings on fabricated ferrous articles.
AS/NZS 4792 – 2006	Hot-dip galvanised (zinc) coatings on ferrous hollow sections applied by a continuous or a specialised process.

**1.4 STANDARDS**

**General**

Standard: To AS 1725.1.  
 Security fences and gates: To 1725.1.  
 Tennis courts: To AS 1725.2 and AS 1725.3.  
 Cricket court: To AS 1725.4.  
 Sports ground: To AS 1725.5.

**1.5 SUBMISSIONS**

**Approval**

Submissions: To the Superintendent’s approval.

**Approvals**

~~Calculations: [complete/delete]~~

Execution: Written approval for access to properties.

Materials: Posts, wire products, concrete, timber, gates.

~~Prototypes: [complete/delete]~~

~~Samples: [complete/delete]~~

~~Technical data: [complete/delete]~~

- Certificates of compliance.

~~Type tests: [complete/delete]~~

~~Warranties: [complete/delete]~~

**1.6 HOLD POINTS AND WITNESS POINTS**

**Notice**

General: Give notice so that the documented inspection and submissions may be made to the **HOLD POINT table** and the **WITNESS POINT table**.

**HOLD POINTS table**

Clause title / item	Requirement	Notice for inspection	Release by
<b>PRE-CONSTRUCTION PLANNING</b>			
<b>Material selection – Material approval</b>	Submit source, type, Certificate of compliance and manufacturer for each type of material	One week before ordering each type	<i>Principal Certifying Authority</i>
<b>EXECUTION</b>			
<b>Establishment</b>			
- <b>General</b>	Confirm approval for access and work on adjacent property	One week before commencing site work	<i>Principal Certifying Authority</i>
- <b>Temporary fencing</b>	No fence to be removed where risk of egress or ingress of stock	One week before commencing site work	<i>Principal Certifying Authority</i>
- <b>Temporary fencing</b>	Maintain rabbit-proof fence at night and	During works	<i>Principal Certifying Authority</i>

	weekends		
- <b>Removal and disposal of surplus material and rubbish</b>	Approval required for burn off for combustible materials	Prior to burning	<i>Principal Certifying Authority</i>
- <b>Clearing and grubbing</b>	Confirm approval for tree removal	One week before next activity	<i>Principal Certifying Authority</i>
<b>Erection of posts</b>			
- <b>General</b>	Dial before you dig to check for underground services	3 working days prior to commencing digging or driving	<i>Principal Certifying Authority</i>
- <b>Depth of posts</b>	Method of installing and proposed type of posts to be used	One week before manufacture or order	<i>Principal Certifying Authority</i>
<b>Erection of wires - General</b>	Approval for any proprietary fasteners	One week before manufacture or order	<i>Principal Certifying Authority</i>
<b>Flood gates - general</b>	Approval to proceed with flood gates and type	One week before fabricating flood gates	<i>Principal Certifying Authority</i>
<b>Stock grids - General</b>	Approval for type and location of grid	One week before fabricating flood gate	<i>Principal Certifying Authority</i>

**WITNESS POINTS table – On site activities**

Item	Requirement	Notice for inspection
<b>MATERIALS</b>		
Steel posts - Fence posts	Welding sites to be cleaned and painted	Progressive
<b>Steel posts - Strainer posts / Intermediate posts</b>	Dimension alternatives	3 working days before commencing works
<b>Gates - General</b>	Fitting alternatives	3 working days before fabrication
<b>EXECUTION</b>		
<b>Establishment</b>		
- <b>General</b>	Take precautions against damage and injury to animals or persons	Progressive
- <b>Removal of existing fencing</b>	Approval to cut posts in rock off at ground level	Before removing fence
- <b>Removal and disposal of surplus material and rubbish</b>	All surplus material to be removed	Progressive
- <b>Clearing and grubbing</b>	Vary fencing to avoid tree removal	One week before activity
- <b>Connections to existing fences</b>	Submit detail of proposed connection	One week before making connection
<b>Erection of posts – Depth of posts</b>	Check diameter of posts	One week before activity
<b>Gates - Erection</b>	Double gates to be directed	One week before ordering
<b>Flood gates – Small water courses</b>	Prevent erosion	Progressive

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## 2 PRE-CONSTRUCTION PLANNING

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### 2.1 MATERIAL SELECTION

#### Material approval

Submit: For each type of material required for supply, submit details of the source, manufacturer and type as applicable including the certificate of compliance. No material is to be delivered or used in the works until approved. This is a **HOLD POINT**.

#### Certificate of compliance

General: Identify the item, record the product certification, inspection or test records that verify conformance.

### 2.2 PROGRAMMING

#### General

- Schedule components and materials to be supplied.
- Program the construction to conform to contract requirements.
- Obtain approvals for access affecting work adjacent to the road reserve.

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## 3 MATERIALS

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### 3.1 STEEL POSTS

#### Steel tubes

Standard: To AS 1725.1 and AS/NZS 1163 and galvanized to AS/NZS 4792.

Type: Medium-quality pipe tube grade (C250L0) to the dimensions as shown on the drawings.

#### Fence posts

Standard: To AS 1725.1.

Type: Medium – quality.

Splicing: Any splicing required must be butt welded and located in the concrete not less than 150 mm below ground level.

Welding: Clean and paint all welding with a cold galvanizing compound (zinc rich paint). This is a **WITNESS POINT**.

Post extensions: To AS 1725.1 for barbed wire attachment.

Connections: If connections are not welded and are subjected to movement, protect the galvanised coatings from scratching caused by the connecting members.

Top caps: Fit each post with a galvanised steel cap to prevent the ingress of water.

#### Star posts (Rural fencing)

Type: ‘STAR’ pattern (‘Y’ bar section) drilled to suit the spacing of the wires shown on the drawing(s).

Protection: Black varnished or hot-dip galvanized to AS/NZS 4680.

Total weight: Total weight of 290 posts each 1.65 m long must be at least one (1) tonne.

#### Pipe rail for pipe rail fencing

Standard: To AS 1725.1.

Type:

- Nominal diameter: 32 mm.
- Outside diameter: 42.4 mm
- Alternatively, as shown on the drawings.

Joints: Only permitted for continuous top rail fencing greater than 6000 mm intervals.

Tight fitting internal swagged or external sleeve joints or screwed and socket joints or butted together centrally over post within the fitting.

#### Strainer posts

Standard: To AS 1074 and galvanized to AS/NZS 4680.

Type: Medium grade tube.

Dimensions:

- Minimum diameter: 150 mm.
- Minimum wall thickness: 4 mm.
- Submit any alternate sizing. This is a **WITNESS POINT**.

Holes: Provide a set of 12 mm holes to suit the spacing of the wires shown on the drawings.

#### **Intermediate posts**

Standard: To AS 1074 and galvanized to AS 4680.

Type: Medium grade tube.

Dimensions:

- Minimum diameter: 150 mm.
- Minimum wall thickness: 4 mm.
- Submit any alternate sizing. This is a **WITNESS POINT**.

### **3.2 CHAIN WIRE AND WIRE NETTING**

#### **General**

Standard: To AS 1725.1 and AS 2423.

Zinc coating: Uniform, continuous, free from imperfections, thoroughly adherent and applied to the wire before the mesh is woven.

Weight: Zinc coating weight  $\geq 290 \text{ g/m}^2$  of wire surface.

PVC coating: Coated in black PVC after galvanizing where specified.

#### **Wire netting used in rabbit-proof fencing**

Type: 105 x 4 x 1.4 (1.065 m wide, 38 mm mesh, 1.40 mm diameter wire) unless documented elsewhere.

#### **Wire netting used in gullies and creek crossings**

Type: 90 x 5 x 1.6 (0.965 m wide, 51 mm mesh, 1.60 mm diameter wire) unless documented elsewhere.

#### **Wire netting standard use**

Type: 105 x 4 x 1.4 (1.05 m wide, 40 mm mesh, 1.40 mm diameter wire) unless documented elsewhere.

#### **Chain wire used in Manproof fencing**

Type: 15 m/1800 x 50 x 3.15/W10Z/HG/KK/HD (rolled length, width, pitch, diameter, metallic coating grade, protective coating system code, selvedge type, service duty) unless documented elsewhere.

### **3.3 GATES**

#### **General**

Standard: To AS 1725.1 and hot dip galvanized to AS/NZS 4680.

Type: Galvanized tubular steel 3.6 m wide, 1.5 m or 1.2 m (as documented to match the height of the fence) in height.

Fittings: Substantial hinges, catch, drop bolts and locking chains unless otherwise shown on the drawings or as directed. This is a **WITNESS POINT**.

Joints: Fully welded fillet welds, minimum 6 mm exposed surface width and cleaned.

#### **Rabbit proofing**

Gates: Rabbit-proof mesh to a height of at least 900 mm above ground level.

### **3.4 REINFORCED CONCRETE POSTS**

#### **Precast strainer posts**

Standard: To AS 3600.

Dimensions: 150 x 150 mm square in section and heights as shown on the drawings.

Holes in posts: 12 mm diameter holes to suit the spacing of the wires shown on the drawings.

Reinforcing steel: Reinforce longitudinally with at least 4 bars of 12 mm diameter, also suitable stirrup reinforcement to control diagonal cracking. As shown on the drawings.

Cover: Longitudinal reinforcement minimum cover = 20 mm. End cover on reinforcement = 20 mm.

Concrete strength: Minimum 28 day compressive strength of 32 MPa.

#### **Precast intermediate posts**

Dimensions: 100 x 100 mm square section and heights shown on drawings.

Reinforcing steel: Longitudinal reinforcing bars may be 9 mm diameter.

Similar: Cover, concrete strength and holes as for strainer posts.

### **3.5 PRESTRESSED CONCRETE POSTS**

#### **Strainer posts**

Tendons: Provide at least 2 high tensile tendons tensioned to conform with the drawings.

Cover: At least 20 mm minimum longitudinal cover.

Cross section: Rectangular section 150 x 100 mm or as shown on the drawings.

Concrete: Minimum 28 day compressive strength of 32 MPa.

Grooves for wire: At least 5 mm deep and 5 mm wide at the surface of the post and to suit the spacing of the wires shown on the drawings.

#### **Intermediate posts**

Tendons: Provide a single high tensile tendon tensioned to conform with the drawings.

Cross section: 100 x 60 mm rectangular.

Grooves: At least 5 mm deep and 10 mm wide at the surface of the post and to suit the wires shown on the drawings.

### **3.6 TREATED TIMBER POSTS AND BRACES**

#### **General**

Hardwood: To AS 2082.

Sawn timber: To AS 2858 and AS 1720 Grade F5.

Treatment: To AS 1604 hazard class H4, containing no mixtures or compounds of the elements chromium and arsenic.

Strainer posts, intermediate posts and bracing: As shown on drawings.

### **3.7 WIRES**

#### **Plain wire**

Standard: To AS 2423.

Type: Low tensile fencing wire (Class W02 or greater, with coating type Z, ZA or E).

Diameters: As shown on the drawings.

#### **High tensile plain wire**

Standard: To AS 2423.

Type: High tensile fencing (Class W02 or greater, with coating type Z, ZA or E).

Diameters: ~~[complete/delete]~~

#### **PVC coated wire**

Core wire: As per plain or high tensile wire above and as specified on the drawings.

Standard: Apply coating to AS 2423.

#### **Barbed wire**

Standard: To AS 2423.

Type: Low tensile barbing wire 2.5 mm diameter galvanized drawn annealed steel wire (Class W02 or greater with coating type Z, ZA or E), with clusters of four barbs spaced between 75 and 110 mm.

Alternative: High tensile barbed wire (Class W02 or greater with coating type Z, ZA or E) of 1.6 mm diameter with clusters of barbs spaced between 75 and 110 mm.

**Cable wire**

Type: Three pairs of 2 × 3.15 mm galvanized iron wire tightly twisted around posts.

Location: As shown in the drawings.

**Tie wire**

Standard: To AS 2423.

Type: Low tensile (Class W02 or greater, with coating type Z, ZA or E) wire, 2 mm diameter galvanized wire.

### 3.8 MISCELLANEOUS HARDWARE

**General**

Standards: Conform to the following:

- Bolts and screws: To AS/NZS 1111.
- Cup head bolts: To AS/NZS 1390.
- Hexagon nuts: To AS 1112.
- Plain washers: To AS 1237.1 and AS 1237.2.
- Hot-dipped Galvanized threaded fasteners: To AS 1214.

Type: Commercial grade bolts, nuts and washers.

### 3.9 CONCRETE BACKFILLING

**Backfilling**

Concrete strength: 20 MPa minimum 28 day compressive strength to conform with the requirements of *0319 Minor concrete works*.

## 4 EXECUTION

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### 4.1 PROVISION FOR TRAFFIC

**General**

Requirement: Conform to *1101 Control of traffic*.

### 4.2 ESTABLISHMENT

**General**

Access: Liaise with property owners, Council and Superintendent to get written approval to access properties for the activities of clearing, fence construction, removal and disposal of materials. This is a **HOLD POINT**.

Damage: The Contractor will be held responsible for any loss, damage, or injury to buildings, goods, crops, livestock, property of any kind or persons due to negligence by the Contractor. This is a **WITNESS POINT**.

Quality: Erect all fencing in a workmanlike manner, a sound, strong and neat appearance when complete.

Uniform grade: If minor irregularities occur in the ground levels, the vertical alignment of the fence is not to follow these irregularities. The fence must align to a uniform grade between definite changes in the natural slope of the ground.

Survey pegs: Leave all survey pegs undisturbed and adjust the post spacing where necessary to avoid pegs.

Stock proof: Maintain the fencing at all times in a condition secure against movement of stock, and take all necessary precautions to prevent people or stock from injury due to fencing activities.

**Removal of existing fencing**

Location: Remove existing fencing as shown on the drawings.

Posts in rock: Seek approval to neatly cut off at ground level. This is a **WITNESS POINT**.

Backfilling of old holes: Backfill all holes left after removal of old fence and compact firmly in layers of maximum depth 150 mm.

Rabbit-proof fence: Replace any buried netting with similar fencing and remove all traces of the old netting.

#### **Temporary fencing**

Stock fence: If there is a risk of egress or ingress of stock, do not remove fencing. Seek direction from Superintendent to supply temporary fencing. This is a **HOLD POINT**.

Rabbit-proof fence: Ensure that at night, weekends or other times when work is not being carried out, the whole of the fence is maintained in a rabbit-proof condition. Seek direction from Superintendent to supply temporary fencing. This is a **HOLD POINT**.

Type: Temporary fencing as documented and shown on the drawings for the new fencing. Use the same erection methods as for the final fencing.

#### **Removal and disposal of surplus material and rubbish**

Contractor's responsibility: Remove or otherwise dispose of all surplus material, offcuts, timber, roots and other debris resulting from the fencing contract to the satisfaction of the Superintendent. This is a **WITNESS POINT**.

Fire damage: Do not burn combustible materials without prior approval. If permitted, burn in conformance with local legislation. Thee Contractor is responsible for any damage which may result from the lighting of fires associated with the work. Do not burn any pre treated timber. This is a **HOLD POINT**.

#### **Clearing and grubbing**

Clearing: Clear a width of one metre on either side of the fence line, and for the full length of the line. Remove: All logs, boulders, stumps, roots, undergrowth and rubbish and dispose in conformance with *1111 Clearing and grubbing* except where directed otherwise.

Trees: Remove trees within this area only as directed by the Superintendent and approved by Council. This is a **HOLD POINT**.

Survey marks: Protect survey marks during the clearing operations.

Trees retained: If trees on or adjacent to the fence line are to be retained, arrange the fencing at the trees as directed. This is a **WITNESS POINT**.

Trees on fence line: Do not strain wire around or against any trees left in the fence line. Provide strainer posts on both sides of each tree.

Damage: Undertake clearing operations to ensure no damage to trees and native shrubs outside the limits of clearing specified.

#### **Connections to existing fences**

Submit: A proposal for connection arrangement where new fencing intersects with existing fencing. This is a **HOLD POINT**.

### **4.3 ERECTION OF POSTS**

#### **General**

Steep locations: Erect all posts vertically except in unusually steep locations where posts may be erected perpendicular to the surface of the ground.

Contact: DIAL 1100 BEFORE YOU DIG is a free service, from anywhere in Australia, of locating underground pipe and cables (possible within two working days). See [www.1100.com.au](http://www.1100.com.au).

Locations: Obtain locations of water, sewer, stormwater, gas, electricity and telephone services. The Utility Authorities: In addition contact names listed in *0136 General Requirements (Construction)* to verify the location of services. This is a **HOLD POINT**.



Concrete for footings and base strips: Crown the top surface at each post to shed water away from the post.

#### Depth of posts

Method: Submit installation method and proposed type of post for approval. This is a **HOLD POINT**.

Sinking depths: Posts must be sunk or driven to the **Posts depth table**.

#### Posts depth table

Type of post	Depth (mm)	
	Earth	Rock
Concrete strainer posts	900	*600
Concrete intermediate posts	600	*450
Treated timber strainer posts	900	600
Treated timber intermediate posts	600	450
Galvanised steel strainer posts	900	*600
Galvanised steel intermediate posts	600	*450
Other steel posts	450	450

\* NOTE Permitted only in cases where posts of the correct length are supplied, otherwise the depth of sinking must be the same as for earth.

Damaged posts: If a post becomes significantly damaged or cannot be driven vertically, remove the post. Erect the same post, if undamaged, or a new post into neatly cut holes backfilled to the full depth with earth (where sunk in earth) or cement mortar or concrete (20 MPa) where in rock.

Posts sunk in earth: If posts are not driven into the earth, the diameter of hole must permit sufficient compaction of the backfill. Backfill earth in layers of 150 mm maximum depth for the full depth of the hole ensuring the relative compaction of the rammed material equals the original undisturbed ground.

Rock holes: Provide posts erected in rock holes with sufficient diameter to permit tight refilling with cement mortar or concrete.

Diameter: 250 mm unless otherwise shown on the drawings. This is a **WITNESS POINT**.

#### Strainer posts

Locations: Provide strainer posts at ends of fencing, angles, intersections with other fencing, gates and at intermediate points.

Distances between strainer posts: 120 metres maximum.

Bracing in one direction: At the ends of fencing and at gates.

Bracing in two direction: At angles in the fence line, abrupt changes of grade and at intermediate points.

Drawings: Other strainer post arrangements as shown on the drawings.

Bracing: Conform to the following:

- Timber posts: Round timber as shown on the drawings.
- Other than timber posts: Medium weight galvanised steel tube to dimensions shown on the drawings.

Distance: Between intermediate point strainer posts < 120 m except in the case of fencing for the retention of cattle < 90 m.

#### Reinforced concrete posts

Foundation: Erect in neatly cut holes sunk in earth, or in rock where this is encountered.

Strainer posts: Backfill to the full depth of the hole with concrete of minimum compressive strength of 20 MPa at 28 days to the requirements of *0319 Minor concrete works*.

Intermediate posts: Backfill to the full depth of the hole with earth, where post is sunk in earth or with cement or concrete (20MPa at 28 days) where the post is sunk in rock.

Cement mortar: 1 cement : 2 sand.

Cutting: Cutting concrete posts is not permitted. To take advantage of the reduced sinking depth for rock, provide posts manufactured in shorter lengths to suit the depth of sinking.

#### **Prestressed concrete posts**

Erection: Either as for the reinforced concrete posts or driven in earth using a suitable post driver to hold the post vertical and in position during driving. Driving prestressed posts is not permitted except where shown on the drawings.

Protect whilst driving: Provide a steel cap with a plywood cushion not less than 12 mm thick to protect the top of the post during driving.

Cutting: Cutting concrete posts is not permitted. To take advantage of the reduced sinking depth for rock, provide posts manufactured in shorter lengths to suit the depth of sinking.

#### **Steel posts**

Driving: If not erected in rock, drive steel posts with suitable driving equipment taking care not to damage the tops of the posts during driving.

Damage to protection: Repair any damage to protective coating using an organic zinc-rich primer in conformance with AS 3750.9.

Rock: Erect posts in neatly cut holes and backfill to the full depth of the hole with cement mortar or 20 MPa concrete.

#### **Treated timber posts**

Erect: Similar to reinforced concrete posts or driven in earth using a suitable post driver. Ensure no damage to the post during driving.

Stiff earth: Drive posts in to holes of a diameter 50 mm less than the nominal maximum post diameter. Drive posts with the small diameter end down. If not driven, erect with butt end down.

### **4.4 ERECTION OF WIRES**

#### **Installation**

Placement: Place all wires as shown on the drawings.

Side fixed wires: Place on the property owners side of the posts.

Fasten and strain: Securely fasten and strain wires to the following nominal tension between strainer posts using a wire strainer and gauge.

**Table for wire tensions**

Wire diameter (mm)	Type	Tension (kN)
4.0	Plain wire	1.8
2.5	H.T Plain wire	1.3
2.5	Barbed wire – L.T	1.3
1.6	Barbed wire – H.T	1.3

Strainer posts: Fix plain and barbed wire at strainer posts as shown on the drawings.

Secure end: Wrap wire at least four times around the tension side of the line.

Top strand: Tie barbed wire in position at the top of reinforced concrete intermediate posts and steel posts as shown on drawings. For timber posts fix to the top of the post using a galvanised staple minimum 40 mm long.

Fixing wires: Fix wires to the posts as shown on the drawings or by using proprietary galvanised fastening clips as approved. This is a **HOLD POINT**.

Prestressed concrete: Securely fasten wires so that they seat firmly in the grooves provided on the side of the posts.

Tie wire: Stretch tight and fit snugly against the side of the post to prevent movement of the wire. Wrap the ends of the tie wire at least twice around the line wire and neatly cut off. Form all joints in wire as figure-of-eight knots as shown on the drawings.

#### 4.5 ERECTION OF NETTING AND CHAIN WIRE MESH

##### Netting

Side: Erect wire netting on the same side of the fence as the line wire.

Type: As shown on the drawings.

Attachment: Attach to the fence using tie wire or fixing clips. Twist each tie wire twice around the fence wire and neatly cut off the ends.

Straining netting: Loosely tie the netting to the fence wires then carefully strain without distorting or breaking the mesh. Tie to the wires immediately on each side of every post at intervals not exceeding 1.0 m.

##### Chain wire mesh

Location: Where documented, or shown on the drawings.

Side: Erect chain wire mesh on the outside of the posts.

Fastened: With two turns of the wire to each cable wire on both sides of each post and at intervals of not more than 900 mm between posts and to each post midway between cable wires.

##### Rabbit-proof fencing

Erect: As for netting and as shown on drawings.

Netting position: Erect wire netting on the side of the fence remote from the roadway in the case of road reserve boundary fences. In other cases, erect the netting as directed.

Fixing of netting: Fix netting with approved tie wire or fixing clips.

Straining and tying: Loosely tie the netting to fence wires then carefully strain without disturbing or breaking the mesh, and then tie to the wires immediately on each side of the post and at intervals not exceeding 1 m.

Bottom section: Bury, or lay flat on the ground, the bottom section of the netting as shown on the drawings.

Burying: If burying the net, excavate the trench prior to running the netting out.

Lap/Trench: Erect the netting so there is a 200 mm lap laid on the ground surface, or trenched 215 mm into the ground as shown on the drawings for the type of fence erected.

Strainer posts: At each strainer post brace attach additional netting adjacent to the strainer post to a height of the top wire 450 mm wide from the post as shown on the drawings.

#### 4.6 GATES

##### Erection

Swing: Erect gates so that they swing away from the road.

Single gates: Supply single gates unless other wise shown on the drawings or as directed.

This is a **WITNESS POINT**.

Level surface: At the location of gates and swing area, level the surface nearly horizontal.

Hanging: Hang the gates and provide with connections and fittings as documented or shown on the drawings.

#### 4.7 FLOOD GATES

##### General

Waters: Make suitable provision for the passage of flood waters past the fence at all watercourses. Provide flood gates of the type indicated on the drawings, or as directed.

This is a **HOLD POINT**.

Prevent: Erect flood gates to prevent the accumulation of flood debris, while remaining stock-proof or rabbit-proof.

**Small watercourses**

Type: Provide flap gate and support frame as shown on drawings or as directed.

Opening: Waterway area at least twice that of the culvert opposite to which it is placed, or as otherwise directed.

Width: < 3.0 m.

Construction detail: Provide a flap of hardwood frame with lapped corner joints each secured by two M6 galvanized bolts. Cover the frame with a 1 mm galvanised sheet secured to the frame by 25 x 2.8 mm galvanised clouts at 100 mm maximum centres. Swing the flap from a hardwood rail connected to the strainer posts located on each edge of the gully or creek with M12 galvanised cup head bolts.

Erosion: Protect the lower edge of the opening from the effects of erosion of the creek bed by installing hardwood sheeting to a minimum depth of 300 mm below the existing ground level and as shown on the drawings. This is a **WITNESS POINT**.

**Gullies and creeks**

Location: Provide flood gates in gullies and creeks at the locations indicated on the drawings, or as directed.

Construction detail: Suspend a 9 mm galvanised steel wire rope over the gully in one span, thread through a strainer post on each edge of the gully and tie back to an anchor set in the footing of each adjacent intermediate post. Provide end connections incorporating a thimble and wire rope grips. Provide turnbuckles at each end to tension the wire rope so that it lays horizontally. Suspend netting from the wire rope, fixed at 200 mm intervals, overlap and tie securely. Provide netting with sufficient length to lie on the ground for a distance of not less than 1.0 m on the downstream side.

Netting ballast: 150 mm diameter treated timber securely fixed to the netting with 25 mm galvanised staples at the downstream end of the netting.

Trim: Trim the sides of the gully, as necessary, to ensure that the flood gate is stock-proof or rabbit-proof.

Flow: Make sure the flood gate has sufficient movement of the suspended portion under the flow of flood waters to prevent damage to the fence and the accumulation of debris against it.

Stay: Each strainer post in three directions, as shown on the drawings.

**4.8 STOCK GRIDS****General**

Location: Where shown on the drawings, or as directed. This is a **HOLD POINT**.

Bedding: Evenly bed the grid base on a continuous layer of 50 mm thick compacted sand or other granular material with a maximum size of 5 mm. Compact bedding material to achieve a density index as determined by AS 1289.5.6.1 of not less than 70%.

Raised abutments: Install grids on raised abutments with approach ramps where possible.

Alternative: Grid may be placed over an excavated pit, in which case adequate drainage must be provided.

Transition: Ensure smooth transition from grid to ground.

Dispose: Dispose of any excavated material.

Single lane grids: No crossfall.

Two lane grids: Each half of the grillage must have a crossfall conforming to the cross fall of the approach road.

Extent of work: The cattle grid construction includes all activities associated with the cattle grid including any adjustments to the fencing as shown on the drawings.

Advance signposting: To AS 1742.2 and *1192 Signposting* on each approach to the cattle grid.

## 4.9 LIMITS AND TOLERANCES

### Application

Summary: The limits and tolerances applicable to this worksection are summarised in

### Summary of limits and tolerances table.

#### Summary of limits and tolerances table

Activity	Limits/Tolerances	Worksection Clause Reference
Steel posts	Type: Medium quality Star posts: Weight of 290 posts 1.65 m long > 1 tonne Pipe rail: Diameter nominal = 32 mm Strainer posts: Diameter = 150 mm Wall thickness > 4 mm	<b>Materials – Steel posts</b>
Zinc coating	Zinc coating weight $\geq$ 290 g/sq m of wire surface	<b>Materials – Chain wire netting</b>
Reinforced concrete posts	Concrete strength > 32 MPa at 28 days	<b>Materials – Reinforced concrete posts</b>
Prestressed Concrete posts	Strainer longitudinal cover > 20 mm Concrete strength > 32 MPa at 28 days	<b>Materials – Prestressed concrete posts</b>
Depth of posts	See Table Post depth	<b>Erection of posts</b>
Backfill	Concrete strength > 20 MPa at 28 days	<b>Erection of posts</b>
Strainer posts	Distance between strainer posts < 120 m Except for cattle retention < 90 m	<b>Erection of posts</b>
Wires	Table for wire tensions	<b>Erection of wires</b>
Flood gates	For small watercourses width < 3.0 m	<b>Flood gates</b>

## 5 MEASUREMENT AND PAYMENT

### 5.1 MEASUREMENT

#### General

Payments made to the Schedule of Rates: To *0152 Schedule of rates – supply projects*, this worksection, the drawings and Pay items **1195.1** to **1195.4** inclusive.

Unpriced items: For each unpriced item listed in the Schedule of Rates, make due allowance in the prices of other items.

#### Methodology

The following methodology will be applied for measurement and payment:

- Clearing and grubbing: To conform with this worksection and not *1111 Clearing and grubbing*.
- Concrete backfilling and blocks: To conform with this worksection and not *0319 Minor concrete works*.
- Signposting: To conform with this worksection and not *1192 Signposting*.

## 5.2 PAY ITEMS

Pay items	Unit of measurement	Schedule rate scope
<b>1195.1 Supply and erection of boundary fencing</b>	Linear metre of fencing, chain link, stock-proof or rabbit-proof, measured on site	Separate pay items to be shown for each type of fence specified. All costs associated with supply of all materials, the clearing of site, and all activities associated with the erection of the fence, including the levelling of mounds (if required), concreting, the provision of crossings for watercourses and depressions as necessary, flood gates as necessary and the connection of the new fence to existing fence where required together with all types of excavation material encountered during construction work, both earth and rock and the removal and disposal of surplus material and rubbish.
<b>1195.2 Supply &amp; erection of boundary fence gates</b>	'Each' gate erected	All costs associated with the supply of all material and all activities associated with the erection of each gate.
<b>1195.3 Supply &amp; installation of cattle grid</b>	'Each' cattle grid installed	All costs associated with the supply of the cattle grid together with all activities associated with the construction of the cattle grid including bedding, approach ramps, wings, drainage, adjustment to fencing and the provision of signs.
<b>1195.4 Removal of existing fence</b>	Linear metre of fencing removed as measured on site	All costs associated with all activities associated with the demolition and disposal of the existing fence.