

**MOKOLO AND CROCODILE  
WATER AUGMENTATION PROJECT  
PHASE 2 (MCWAP-2)**

**TENDER NO 054/2024/PMID/MCWAP2/RFB**

**PART C3.1  
SPECIFICATION**

**SECTION 6**

**FENCING**

# PART C3.1 SPECIFICATION

## SECTION 6 FENCING

### TABLE OF CONTENTS

	PAGE
<b>SECTION 6</b> .....	<b>1</b>
<b>6.1 SCOPE</b> .....	<b>1</b>
<b>6.2 DEFINITIONS</b> .....	<b>1</b>
<b>6.2.1 Definitions</b> .....	<b>1</b>
<b>6.2.2 References</b> .....	<b>1</b>
<b>6.3 MATERIALS</b> .....	<b>2</b>
<b>6.3.1 Posts (corner, straining, gate, etc.), Stays, Standards, Droppers, Wire, Binding Wire, Fencing, Concrete and Gates</b> .....	<b>2</b>
<b>6.3.2 Wire and Mesh</b> .....	<b>4</b>
<b>6.3.3 Gates and Padlocks</b> .....	<b>5</b>
<b>6.3.4 Steel Palisade Fences</b> .....	<b>5</b>
<b>6.3.5 Motor Grid Gates</b> .....	<b>6</b>
<b>6.4 CONSTRUCTION</b> .....	<b>6</b>
<b>6.4.1 General</b> .....	<b>6</b>
<b>6.4.2 Types of Fencing</b> .....	<b>6</b>
<b>6.4.3 Clearing the Fence Line</b> .....	<b>7</b>
<b>6.4.4 Erecting Straining Posts and Standards</b> .....	<b>7</b>
<b>6.4.5 Erecting Fence Wires</b> .....	<b>8</b>
<b>6.4.6 Erecting Diamond Mesh</b> .....	<b>9</b>
<b>6.4.7 Erecting Weld Mesh</b> .....	<b>9</b>
<b>6.4.8 Closing Openings under Fences</b> .....	<b>9</b>
<b>6.4.9 Erecting Gates</b> .....	<b>10</b>
<b>6.4.10 Steel Palisade Fences</b> .....	<b>10</b>
<b>6.4.11 Disposal of Surplus Material</b> .....	<b>10</b>
<b>6.5 MEASUREMENT AND PAYMENT</b> .....	<b>10</b>

## SECTION 6

### FENCING

#### 6.1 SCOPE

This Section covers the erection, maintenance and where necessary, the removal of all fencing required on this Contract. This includes high level security fences as well as temporary and permanent fences of different types, but excludes electrified fences and fences associated with site office and workshop establishment.

#### 6.2 DEFINITIONS

##### 6.2.1 Definitions

The following terms shall have the meanings given:

- a) **“Straining posts”** means mild steel tubing spaced at a maximum of 180 m centres unless otherwise shown on the Drawings and anchored in such manner to stabilise and strengthen a fence.
- b) **“Stays”** which includes inclined or horizontal struts means mild steel tubing required for anchoring of straining posts.
- c) **“Standards”** means Y-sections spaced at a maximum of 15 m centres unless otherwise shown on the Drawings between straining posts to support and strengthen the fence.
- d) **“Droppers”** means ridgeback pattern sections spaced at a maximum of 3 m centres between standards.
- e) **“CKS”** means the SANS co-ordinating specifications. CKS 82 = Steel posts, stays, standards, and droppers for strained wire fences.
- f) **“Temporary fence / fencing”** means fences erected along the construction servitudes for purposes of demarcating and securing the site and which will be removed on completion of the Works.
- g) **“Permanent fence”** means fences erected along the cadastral boundaries of farms, permanent servitudes and sites as directed by the Engineer and which will be left in place on completion of the Works.
- h) The terms **“fence”** and **“fencing”** are used interchangeably and shall have the same meaning.
- i) The terms **“game proof fences”** and **“game fences”** are used interchangeably and shall have the same meaning.

##### 6.2.2 References

When reference is made to a Code of Practice, Specification or Standard, the reference shall be taken to mean the latest edition or replacement at time of tender of the Code, Specification or Standard; including addenda, supplements, modifications and revisions thereto. Where a previous version is intentionally used, it will be indicated as such. Where reference is made to a Code, Specification or Standard that has subsequently been withdrawn and not replaced, the intended content will remain relevant unless confirmed otherwise in writing by the Engineer.

## **6.3 MATERIALS**

### **6.3.1 Posts (corner, straining, gate, etc.), Stays, Standards, Droppers, Wire, Binding Wire, Fencing, Concrete and Gates**

#### **6.3.1.1 General**

Corner posts, straining posts, stays, standards and droppers shall be the type and size indicated on the Drawings.

#### **6.3.1.2 Seven Strand Stock-Proof Fence**

Steel sections shall comply with the requirements of CKS 82.

Straining, gate, bend, end and intermediate posts shall be 2.1 m long 88 mm outside diameter by 3 mm wall thickness mild steel tubing, and inclined and horizontal stays shall be 2.1 m and 2.0 m long respectively and of 48 mm outside diameter by 3 mm thick mild steel tubing, unless otherwise shown on the Drawings. Standards shall be 1.85 m long 2.50 kg/m rolled steel Y-sections. Droppers shall be 1.25 m long 0.56 kg/m ridged mild steel T-Sections.

All tubular posts shall be provided with a 300 mm x 300 mm x 3 mm footplate with a 10 mm hole in the middle, and a 4 mm pressed-steel or cast-iron cap to prevent any moisture from entering, all as shown on the Drawings. Rolled steel sections shall be provided with a protective coating of tar or other approved material.

Gate posts shall be galvanized mild steel construction members and configurations as detailed on the Drawings. All joints shall be welded all round construction 7.4 padlock and chain. Link chain 450 mm long with centre welded to 48 OD pipe and fitted with 30 diameter x 5 diameter ring at each end with padlock.

Barbed wire (in accordance with SANS 675 – 2011) Campeon high-tensile grade steel – strand 2.8 mm x 1.9 mm oval wire with 4 x barbs evenly spaced at 125 mm centres. Binding wire shall be 2.0 mm mild steel for tying posts, droppers and standards.

Bolts for struts shall be 12 mm fully galvanized with nuts and washers. Wire stays shall be 4 mm 8-cord straining wire.

#### **6.3.1.3 Game Fences**

Steel sections shall comply with the requirements of CKS 82.

Straining, gate, bend, end and intermediate posts shall be 3.3 m long (2.4 m high fence), 114 mm outside diameter x 4 mm wall thickness mild steel tubing, and the inclined struts shall be 3.3 m long x 60 mm outside diameter x 3 mm thick mild steel tubing unless otherwise shown on the Drawings. Horizontal struts shall be 2.0 m long x 60 mm diameter x 3 mm wall thickness mild steel. Standards (average 83/km) shall be 3.05 m long, 2.50 kg/m rolled steel Y-section posts. Droppers (average 581/km) shall be 2.45 m long, 0.56 kg/m ridged mild steel T-Section posts.

All tubular posts shall be provided with a 300 mm x 300 mm x 3 mm footplate with a 10 mm hole in the middle, and a 4 mm pressed-steel or cast-iron cap to prevent any moisture from entering, all as shown on the Drawings. Rolled steel sections shall be provided with a protective coating of tar or other approved corrosion protection.

PART C3.1 - SPECIFICATION

---

Gate posts shall be galvanized mild steel construction members and configurations as detailed on the Drawings. All joints shall be welded all round construction 7.4 padlock and chain. Link chain 450 mm long with centre welded to 48 OD pipe and fitted with 30 diameter x 5 diameter ring at each end with padlock.

Wire shall be 3 mm diameter mild steel or 2 mm diameter high-tensile steel round wire fully galvanized (yellow label). Binding wire shall be 2 mm mild steel for tying posts, droppers and standards.

Bolts for struts shall be 12 mm fully galvanized with nuts and washers. Wire stays shall be 4 mm 8-cord straining wire.

#### **6.3.1.4 High Security Fences**

Gate posts shall be hot-dipped galvanised (Heavy Duty) 140 mm square by 10 mm thick steel tubing, as specified of the Drawings and Section 37. Inter-straining, corner and end posts shall be hot-dipped galvanised (Heavy Duty) 120 mm by 120 mm by 15 mm thick mild steel angle. Inter-post shall be hot-dipped galvanised (Heavy Duty) 70 mm by 70 mm by 10 mm thick mild steel angle. Post stays shall be hot-dipped galvanised (Heavy Duty) 70 mm by 70 mm by 10 mm thick mild steel angle.

All posts shall be provided complete with necessary fittings, double leaf overhangs and capped as specified on the Drawings.

#### **6.3.1.5 Contractor's Establishment Area**

Gate posts shall be hot-dip galvanised (light-duty) 140 mm square x 10 mm thick steel tubing 3.2 m long, as specified on the Drawings. Inter-straining, corner and end posts shall be hot-dip galvanised (light-duty) 120 mm x 120 mm x 8 mm thick mild steel angle iron 3.2 m long complete with the necessary fittings. Stay bracings shall be 50 mm x 50 mm x 5 mm thick hot-dip galvanised mild steel angle iron. Inter-posts shall be hot-dip galvanised (light-duty) 70 mm x 70 mm x 8 mm thick mild steel angle iron. Post stays shall be hot-dip galvanised (light-duty) 70 mm x 70 mm x 8 mm thick x 3.2 m long complete with the necessary fitting hot-dip galvanised mild steel angle iron. All posts shall be provided complete with necessary fittings, double leaf overhangs and capped as specified on the Drawings.

Tie-wire (Straining wire to inter-post) shall be 3.0 mm diameter hot-dip galvanised (light-duty). Tie-wire (Flat coils to straining wire) shall be 1.6 mm diameter hot-dip galvanised (light duty) to comply with SANS 675. Bolts and nuts shall be mild steel galvanised to SANS 121. Eye bolts shall be 10 mm diameter (mild steel) that may be welded to post galvanising. No drilling, cutting or welding shall be carried out on mild steel parts after galvanising. All mild steel parts shall be correctly cut, drilled and welded before galvanising.

All stays, stay bracings and gate posts (except the inter and inter-straining posts) shall be sullied in pairs, on the right and left, each complete with the necessary fittings. Mesh shall be 50 mm diamond mesh from 2.5 mm wire to SANS 1373, class B galvanised. The razor cut coil (connection type) shall be attached to the fence.

Concrete:

- Gate posts 30/38;
- Intermediates 15/9; and
- Stays 15/9.

### **6.3.1.6 Gates**

Gates shall be as per specified type and dimensions as indicated on the Drawings. Where existing gates are replaced it shall be of similar width and equal functions as the existing to maintain comparable access for agricultural activities.

### **6.3.1.7 Bolts and Hinges**

Bolts shall be of stainless steel or fully galvanised to SANS 121 mild steel material, and of the required length and diameter which shall not be less than 12 mm. All the necessary bolts, nuts and washers, shall be supplied with each post.

Gates for stock-proof and game fences shall be mounted on the gate post by means of 30 mm diameter fully galvanised to SANS 121 mild steel eyebolt hinges.

## **6.3.2 Wire and Mesh**

### **6.3.2.1 Barbed Wire**

#### **(a) Seven Strand Stock-Proof Fence**

Barbed wire shall comply with the requirements of SANS 675 and shall be Campeon high-tensile-grade steel single-strand 2.8 mm x 1.9 mm oval-shaped fully galvanised wire. Barbs shall be manufactured from 2.0 mm zinc-coated mild steel wire and shall be evenly spaced at not more than 125 mm.

#### **(b) Game Fences**

Barbed wire shall comply with the requirements of SANS 675 and shall be Campeon high-tensile-grade steel single-strand 2.8 mm x 1.9 mm oval-shaped fully galvanised wire. Barbs shall be manufactured from 2.0 mm zinc-coated mild steel wire and shall be evenly spaced at not more than 125 mm.

#### **(c) High Security Fences**

Wire shall comply with the requirements of SANS 675 and shall be 3 mm diameter mild steel or 2 mm diameter high-tensile-grade steel round wire (yellow label).

### **6.3.2.2 Smooth Wire**

Smooth wire shall comply with the requirements of SANS 675 and shall be of the types specified below:

- a) For high security fences, straining wire shall be Gauge no 8 hot-dipped galvanised (Class A) high-tensile-grade steel wire;
- b) Other fencing wire shall be high-tensile-grade steel 2.24 mm diameter hot-dipped galvanised (Class A) wire;

## PART C3.1 - SPECIFICATION

- c) Tying wire for security fences shall be hot-dipped galvanised (Class A) and be 3.0 mm diameter mild-steel wire for tying straining wire to inter-posts and 1.60 mm diameter for tying flat coils or welded mesh to straining wire. For stock-proof and game fences tying wire shall be 2.0 mm diameter mild-steel hot-dipped galvanised (Class A) wire for tying to posts, standards and droppers;
- d) All diamond mesh (Chain-link fencing) shall comply with the requirements of SANS 1373. The width shall be as shown on the Drawings, and both edges shall be clinched; and
- e) The diameter of the diamond mesh wire shall be 2.5 mm and the mesh size shall be as shown on the Drawings, and the wire shall be Class A galvanized.

### 6.3.2.3 Weld Mesh

Double line wire mesh shall be fabricated generally in accordance with SANS 10244-2 and shall have an aperture size not exceeding 10 mm. The mesh shall be supplied in sheets of the appropriate height, and shall be fabricated from 4 mm mild steel wire. The wires shall be protected by Zinc Alu Super.

### 6.3.3 Gates and Padlocks

Gates shall be as per specified type and dimensions as indicated on the Drawings and as follows:

Gates shall be fabricated with a 48 mm OD tube frame in accordance with SANS CKS 146 and with the details shown on the Drawings. Gates shall be supplied complete with centre and diagonal braces.

Gates for stock-proof and game fencing: 3.6 m to 5.0 m wide and the same height as the fence (i.e. 1.25, 1.8 and 2.4 m high).

Security gates: 3.1 m wide x 3 m high x 2 no. (Double gate).

Gate for Contractor's Establishment Area: 3 m wide x 2.4 m high x 2 no. (Double gate).

Gates shall be complete in every respect, including hinges, washers, bolts and locking chains attached to the gate. Gate material shall be hot-dipped galvanised in accordance with Section 37 - Painting and Corrosion Protection and the Drawings.

Security gates shall be provided with one "Multi T-lock" padlock for each gate. Gates for stock-proof and game fencing shall be provided with a 450 mm length of link chain with the centre welded to 48 mm outside diameter pipe, and fitted with a 30 mm diameter x 5 mm ring at each end with a padlock. Padlock keys to be duplicated for all the locks with a maximum of 10 keys per padlock. Each gate shall have two locks, the Contractor's and the farmer's, and shall lock into each other. Both parties will therefore have access.

The Contractor shall provide a method statement describing key and access control.

### 6.3.4 Steel Palisade Fences

Steel palisade fences shall be 1.2 m, 1.5 m, 1.8 m, 2.0 m, 2.4 m or 3.0 m high, with spiked pales of hot rolled equal angle iron 25 x 25 mm, 30 x 30 mm or 40 x 40 mm, by 2 mm or 2.5 mm as scheduled or shown on the Drawings. Posts shall be of 76 x 76 x 1.6 mm square tubing, with fixing brackets and cap tops. All elements shall be hot-dip galvanised after cutting and welding.

### **6.3.5 Motor Grid Gates**

All motor / cattle grid gates shall consist of a concrete floor pit approximately 3 m wide, 1.5 m long and 500 mm deep, with concrete or masonry walls around the sides. The pit is spanned by a grid consisting of steel pipes or mild steel railway supported by the side walls and brick sleeper walls.

At the ends and in the middle of the pipes there are steel constructions to hold the pipes down and to keep them apart at the required distances. The cattle grid shall be built in such a way that runoff water from the road does not flow into the pit. Provision shall be made for rainwater caught by the pit to drain away from the pit.

Cross members shall be one of the following:

- a) Mild steel railway with a unit mass, depending on the road width, of between 22 kg/m and 48 kg/m. Second-hand sections may be used subject to the Engineer's approval; and
- b) Steel pipes of 76 mm outside diameter.

## **6.4 CONSTRUCTION**

### **6.4.1 General**

Fencing and barriers shall be in place in accordance with the Occupational Health and Safety Act, No. 85 of 1993.

No existing or permanent fences adjacent to the Works shall be damaged.

Existing fences may be removed and replaced only on the written instruction of the Engineer.

In general, temporary fences shall be of the same standard or type of fence they temporarily replace during construction, and shall as a minimum, conform to this Specification.

The Contractor shall accommodate the movement of vehicles, pedestrians, game and/or livestock across the construction area by means of the provision of a corridor of 30 m in length at intervals to be indicated by the Engineer. Gates shall be constructed at the two openings of the servitude adjoining and across the corridor to prevent vehicles, pedestrians, game and/or livestock entering the construction area.

No temporary fence shall be dismantled until after the completion, commissioning, acceptance testing and the maintenance phase of the rehabilitation of the complete pipeline, and other components / infrastructure of the project.

Daily patrolling and maintenance of damaged fences shall be conducted by the Contractor and shall be repaired within one (1) day of the damage taking place and immediately in areas housing stock. Illegal snares and traps shall be removed during routine maintenance patrols as per Section 4 – Environmental Management.

### **6.4.2 Types of Fencing**

The following types of fences shall be erected in accordance with the dimensions and details shown on the Drawings:

- a) Seven strand stock proof fence at 1.2 metres high (Drawing No: Plan 050P05.1);

## PART C3.1 - SPECIFICATION

- b) Sixteen strand game proof fencing at 1.8 metres high;
- c) Twenty-one strand game proof fencing at 2.4 metres high (Drawing No: Plan 050P05.3);
- d) High security fencing at 3 metres high (Drawing No's: 1B-C6-001 to 1B-C6-008);
- e) Where existing fences have to be dismantled and re-erected, they shall be re-erected either to the same design as the original, but with such modifications as may be required by the Engineer, or they shall be re-erected to one of the standards specified, all as ordered by the Engineer. The Contractor shall keep complete records of where fencing has been removed by means of surveying and referenced GPS points in order to re-erect at the correct locations on completion of the civil Works. Copies of these records are to be updated regularly and be made available to the Engineer on his request; and
- f) Contractor's establishment area fencing 2.4 m high (Drawing No 1A-C6-037).

#### 6.4.3 Clearing the Fence Line

This applies to the temporary fences to be erected, all the permanent security fencing around the main infrastructure, as well as security fencing required around the Contractor's and Engineer's establishment area.

The clearance width shall be 0.5 m on each side of the fence line. Clearing the fence line shall include the removal of all trees (after acquiring the necessary permits as specified in Section 3: Integrated Environmental Management), scrub, stumps, isolated boulders or stones and other obstructions which will interfere with the construction of the fence. Stumps within the cleared space shall be grubbed as described. The bottom of the fence shall be located at a uniform distance above the ground line in accordance with the requirements shown on the Drawings. All material removed shall be disposed of in designated spoil areas, except for all plant material and other waste that have to be disposed of at a licenced waste facility.

Any area where clearing is not permitted by the owner or is impracticable shall not be cleared if so directed by the Engineer. Clearing and grubbing to comply with Section 7 – Clearing Site and Clause 7.6.1 in particular, as well as with Clause 4.3.9 in Section 4 – Integrated Environmental Management.

Where existing fences are dismantled and/or replaced, all unused, old or cut-off wires and other material shall be removed from the Works to a suitable disposal site for recycling to prevent harm to stock or game. Refer also to Waste Management in Section 4 – Integrated Environmental Management.

#### 6.4.4 Erecting Straining Posts and Standards

Straining posts shall be erected at all terminal points, gates, low points (as required), corners and bends in the fencing and at all junctions with other fences. Straining posts shall not be spaced further apart than shown on the Drawings. The length of posts above ground shall be such that the correct clearance between the lowest wire and the ground is maintained.

Straining posts shall be accurately set in holes unless otherwise shown on the Drawings of at least 400 mm x 400 mm on the surface, and broaden downwards with the bottom being approximately 500 mm x 500 mm, and shall be provided with concrete bases to the dimensions shown on the Drawings. In sandy soils the Contractor shall endeavour to get the sides of the hole as near to vertical as possible. A hole of the same diameter as a post and 100 mm deep shall be dug in the centre of the bottom of the hole. The post is placed in the small hole and held upright while the concrete is cast around it and compacted. Where, on account of the presence of rock, the holes cannot be excavated by hand or by pneumatic tools and the Contractor has to resort to the use of explosives, he will be paid separately for the drilling and blasting operations required.

## PART C3.1 - SPECIFICATION

Concrete to the high security fence gate-threshold shall be of 30 MPa strength and for kerbs; straining post bases and corner posts shall be of 15 MPa strength, and to the dimensions as shown on the Drawings. No stress shall be applied to the straining posts within 7 days after the casting of concrete bases. Holes shall be dug to the full specified depth. All straining posts shall be braced by means of stays or anchors as shown on the Drawings or as directed by the Engineer. Tubular or angular stays shall be bolted to the posts.

Standards shall be firmly planted into the ground at a spacing of 12 m apart or as shown on the Drawings, or as directed by the Engineer. The spacing of standards between any two successive straining posts shall be uniform and not greater than that shown on the Drawings. In rock or hard material, standards shall be either driven or set in holes drilled into the rock. The size of drilled holes shall provide a tight fit to the standards. Care shall be taken when driving standards to prevent their buckling or being damaged.

All straining posts and standards shall be accurately aligned and set plumb. Where veranda-type of security fencing is used, the posts shall be planted with the overhang on the outside of the area being fenced and perpendicular to the direction of the fence. After the straining posts and standards have been firmly set in accordance with the foregoing requirements, fence wires shall be attached thereto at the spacing shown on the Drawings.

When removing existing fences across the pipeline servitude, the existing fences shall be terminated on the servitude boundaries with new straining posts. Existing fencing wires shall be loosened, tensioned and tightened so as to maintain the integrity of the fence at all times.

#### **6.4.5 Erecting Fence Wires**

All fencing wire shall be tied to the sides of standards or posts to prevent the wires from being displaced or becoming loose. The wire shall be carefully tensioned without sagging, and true to line, care being exercised not to tension the wire to such an extent that it will break, or that end, corner, straining or gate posts will be pulled out.

Each strand of fencing wire shall be securely tied in the correct position hard up to each standard or post with soft galvanized tying wire. The tying wire for each strand shall pass through a hole or notch in the standard or post while the ends of the tying wire shall be wound at least four times around the fencing wire to prevent it from moving in a vertical direction as detailed on the Drawings.

At all straining posts at terminal points, gates, corners, bends and other specified positions, the fencing wire shall be securely wrapped twice around the post and secured against slipping by tying the end tightly around the wire by means of at least six snug tight twists.

Where high-tensile wire is used, two long twists may first be made followed by the six tight, snug twists around the post to prevent the wire from breaking at the first twist. When smooth wire is used, the loose end shall preferably be bent over and hooked into the notch between the fencing wire and the first twist.

Splices in the fencing wire shall be permitted if made in the following manner with a splicing tool:

- The end of each wire at the splice shall be taken at least 75 mm past the splicing tool and wrapped snugly around the other wire by not less than six complete turns with the two separate wire ends being turned in opposite directions; and
- After the splicing tool has been removed, the space left by it in the spliced wire shall be closed by pulling the wire ends together. Unused wire ends shall be cut close so as to leave a neat splice.

PART C3.1 - SPECIFICATION

---

Where indicated on the Drawings, the gaps between gate posts and the adjacent straining posts shall be fenced off with short lengths of fencing wire and properly secured and tensioned.

Droppers shall be tied to each fence wire with a tying wire, as specified on the Drawings, in the required position as specified for standards to prevent slippage in a vertical direction. The spacing of droppers between any two straining posts shall be uniform.

Anchoring to structures shall be done as shown on the Drawings.

#### **6.4.6 Erecting Diamond Mesh**

Where indicated on the Drawings, diamond mesh shall be stretched against the fence and properly tied to the fencing wire. The diamond mesh shall be secured by means of binding wire at 1.2 m centres along the top and bottom wires, and at 3 m centres along each of the other fencing wires, unless shown otherwise on the Drawings.

#### **6.4.7 Erecting Weld Mesh**

Corner and gate posts shall be drilled to take the straining bolts where so specified or as shown on the Drawings.

Corner and gate posts shall be set plumb and in correct alignment and provided with galvanized iron medium tubing stays. Posts shall be firmly embedded in the ground to a depth of 0.6 m, and surrounded with a mix 15 MPa concrete block, 600 x 600 x 800 mm. Stays shall be flattened one end, bent, fitted and bolted to the posts with M12 GI bolts. The other end of the stay shall be provided with a 150 x 150 x 6 mm MS footplate and planted in mix 15 MPa concrete of not less than 0.1 m<sup>3</sup> volume. Where the posts and stays consist of wooden poles, the footplate shall be omitted. Where the distance between corner and/or gate posts exceeds 500 m, straining posts of the same type as the corner posts shall be provided and adequately stayed.

Where corner and gate posts are provided with a 45° overhang, the standards shall be provided with a similar overhang. Standards shall be set plumb and sunk 0.75 m (or 0.45 m when set in concrete) into the ground at a spacing not exceeding 3 m. When set in concrete, they shall be surrounded with a mix 15 MPa concrete block 375 x 375 x 650 mm.

Where posts and standards consist of metal tubing, they shall be fitted with cap tops.

Four straining wires shall be spaced at equal intervals and shall be properly strained to the posts with M12 x 300 mm GI straining bolts.

The fence shall be covered with a wire mesh. The mesh and barbed wire shall be tightly strained to posts and tied with tie wire. The mesh shall also be tied to the straining wires at 0.6 m intervals.

#### **6.4.8 Closing Openings under Fences**

The Contractor shall ensure that the fence alignment follows the natural ground level. All openings underneath the fences shall be closed up as indicated on the Drawing. This shall be done to the satisfaction of the Engineer.

Constructed draining channels, dongas, small streams, and rivers shall be fenced off in accordance with the details contained on the Drawings.

#### **6.4.9 Erecting Gates**

Gates shall be erected at the positions indicated on the Drawings or as directed by the Engineer. The gates shall be hung on gate fittings in accordance with the requirements shown on the Drawings. Gates shall be so erected as to swing in a horizontal plane at right angles to the gate posts, clear of the ground in all positions.

Conventional farm fence access gates shall be minimum 3.6 m wide by 1.2 m high. The frame shall be produced of 43 mm diameter pipe with minimum 2 mm wall thickness. The gate frame and hinges shall be galvanised protected. Where required a double leaf opening can be instructed by the Engineer.

In high security fences the double swing gates shall have a gap not exceeding 40 mm between them when closed and the clearance below the gates shall not exceed 60 mm with the gates closed.

The uprights of other gates shall be between 25 and 50 mm from the gate post when closed. The clearance below the gates shall not exceed 75 mm with the gates closed.

#### **6.4.10 Steel Palisade Fences**

Posts shall be erected at a nominal spacing of 3 m, and each post shall be cast in a concrete block of 500 x 500 x 500 mm. All fixing done after galvanising shall be by bolting, using sunk M8 cup square bolts.

#### **6.4.11 Disposal of Surplus Material**

All unused and surplus materials and cut-off wires shall be removed from the work area to a suitable stockpile or disposal site to prevent harm to stock or game. Refer also to Section 4 – Integrated Environmental Management.

### **6.5 MEASUREMENT AND PAYMENT**

The rates tendered under this Section shall not include for the general obligations, Contractor's Equipment and work deemed to be covered by the items provided in Section 1 – General.

#### **6.001 Clearing the fence line, 1 m wide strip**

**Unit: metre (m)**

Clearing the fence line shall be measured by length along each fence line.

The rate tendered shall allow full compensation for clearing the fence line complete as specified, including amongst others, the removal of trees, stumps, stones, and other obstructions and the disposal of all waste material resulting from clearing operations, as may be directed. The removal of trees and stumps will not be paid for separately.

## PART C3.1 - SPECIFICATION

---

**6.002 Supply, erect and maintain during contract period new fencing material for new fences Unit: metre (m)**

- a) **Seven strand stock-proof fence (1.25 m high)**
- b) **Sixteen strand game proof fencing (1.8 m high)**
- c) **Twenty-one strand game proof fencing (2.4 m high)**
- d) **Bonnox (or similar type) (1.8 m high)**
- e) **Bonnox (or similar type) (2.4 m high)**
- f) **Inner Security Fencing**
- g) **Outer Security Fencing**

The unit of measurement for erecting a fence line shall be the metre of fence line measured along each fence line. The unit rate shall allow full compensation for erecting the fence line, inclusive of all excavation and backfill, wire, corner and intermediate straining posts, standards, droppers and bolts, corrosion protection, all complete as shown on the Drawings.

It shall also allow for the closing-off of any ditches to the detail as shown on the Drawings.

Payment for fencing shall be made at 100% of the rate tendered when the fencing is erected and approved by the Engineer.

**6.003 Remove fencing installed under this contract and re-erect at another position Unit: metre (m)**

- a) **Seven strand stock proof fence (1,25 m high)**
- b) **Sixteen strand game proof fencing (1.8 m high)**
- c) **Twenty-one strand game proof fencing (2.4 m high)**
- d) **Bonnox (or similar type) (1.8 m high)**
- e) **Bonnox (or similar type) (2.4 m high)**

The unit of measurement for removing the fence line, re-erecting and maintaining during the contract period shall be the metre of fence line installed and removed, measured along each fence line. The unit rate shall allow full compensation for removal and re-erecting of the fence line, inclusive of all wire, standards, droppers and bolts and corrosion protection, all complete as shown on the Drawings.

The tendered rate for each metre of existing fence moved shall include full compensation for dismantling the old fence, disposing of material unsuitable for re-use, coiling and stacking the material suitable for re-use, moving all material, including posts and wire and again putting up the fence or gate at the new position and the provision of binding, tying and straining wire.

The rate shall also include the closing-off of any ditches to the detail as shown on the Drawings.

Payment for temporary fencing shall be certified as follows:

- i) 70% of the rate tendered when the fencing is erected; and
- ii) 30% of the rate tendered when the fencing is removed from site.

## PART C3.1 - SPECIFICATION

- 6.004 Remove fencing installed under this contract and re-erect at another position** **Unit: metre (m)**
- a) **Seven strand stock-proof fence (1.25 m high)**
  - b) **Sixteen strand game proof fencing (1.8 m high)**
  - c) **Twenty-one strand game proof fencing (2.4 m high)**
  - d) **Bonnox (or similar type) (1.8 m high)**
  - e) **Bonnox (or similar type) (2.4 m high)**

The unit of measurement for the removal of fences shall be the metre of fence, the quantity of which shall be taken as the length of fence and posts which has been completely removed and disposed of.

The rates shall include all haulage and no free haul shall be applicable.

- 6.005 Supply, erect and maintain gates during contract period** **Unit: number (No)**
- a) **1.2 m high gates for stock proof fences**
  - b) **1.8 m high gates for game proof fences**
  - c) **2.4 m high gates for game proof fences**
  - d) **1.8 m high gate for Bonnox (or similar type) fences**
  - e) **2.4 m high gate for Bonnox (or similar type) fences**

The unit of measurement shall be the number of gates erected. The rates tendered shall include full compensation for procuring and furnishing all gates and other material for the gates including the gate posts, hot-dip galvanizing of all parts, and installing and maintaining the gates complete as specified and as shown on the Drawings.

- 6.006 Remove gates installed under this contract and re-erect at another position** **Unit: number (No)**
- a) **1.2 m high gates for stock proof fences**
  - b) **1.8 m high gates for game fences**
  - c) **2.4 m high gates for game fences**
  - d) **1.8 m high gates for Bonnox fences**
  - e) **2.4 m high gates for Bonnox fences**

The unit of measurement shall be the number of gates. The rates tendered shall include full compensation for procuring and furnishing and maintenance of all material for the gates including the gate posts, hot-dip galvanizing of all parts, and for the removal and re-installing the gates complete as specified and as shown on the Drawings.

PART C3.1 - SPECIFICATION

---

The tendered rate for each gate moved shall include full compensation for dismantling the old gate, disposing of material unsuitable for re-use, stacking the material suitable for re-use, moving all material, including posts and wire and again putting up the gate at the new position and the provision of binding, tying and straining wire.

Payment for temporary gates shall be certified as follows:

- i) 70% of the rate tendered when the gate is erected; and
- ii) 30% of the rate tendered when the gate is removed from site.

**6.007 Removal of gates****a) All types of gates****Unit: number (No)**

The measurement for removal of gates shall be the number of gates and posts removed and disposed of.

The tendered rate for each gate removed shall include full compensation for dismantling the old gate, disposing of material, including posts and wire.

The rates shall include all haulage and no free haul shall be applicable.