



REHABILITATION OF MARETLWANE NORTH ASBESTOS MINE: RE-ADVERTISEMENT

CONTRACT MTK 19/2022

VOLUME 2

PART 3:

SCOPE OF WORK



C3 SCOPE OF WORK

GENERAL

This section specifies and describes the supplies, services, engineering and construction works which are to be provided and any other requirements and constraints relating to the manner in which the contract work is to be performed.

The Contract Document is compiled in accordance with the General Conditions of Contract for Works of Civil Engineering Construction, Third Edition (2015) and Tenderers are therefore required to price the Tender accordingly.

SCOPE

The Scope of the Work is set out in three portions:

Portion 1: PROJECT SPECIFICATION covers a general description of the project, the facilities available and the requirements to be met.

Portion 2: VARIATIONS AND ADDITIONS TO THE STANDARDIZED SPECIFICATIONS covers variations to the Standardized Specifications which are applicable to the contract.

Portion 3: PARTICULAR SPECIFICATIONS FOR CIVIL WORKS covers additional specifications that are applicable to the Civil Portion of the Contract.

Should any requirement of the Project Specification (i.e. Portions 1 to 3) conflict with any requirement of the standardized or particular specifications, the requirements of the latter shall take precedence.



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PORTION 1: PROJECT SPECIFICATION

PS 1. DESCRIPTION OF THE WORKS

PS 1.1 Employer's Objectives

The goal of the project is to provide a permanent solution to the hazardous exposure of asbestos and other mining related hazards at the derelict Maretlwane North asbestos mine site, located near Penge Village in the Limpopo Province. The objective is to minimize the possibility of airborne and/or waterborne asbestos fibers. The solution adopted is to reshape the existing dumps, moving waste rock, provide capping and erosion protection to the dump and sealing any openings.

PS 1.2 Overview of the Works

The construction works comprises of, removal of asbestos material, top soil and vegetation where necessary, stockpiling, haulage and earthworks, capping, sealing of shafts and adits, erosion protection, vegetation measures, demolition of existing buildings and ancillary works. Temporary works include the construction and rehabilitation of access to the site.

PS 1.3 Scope of Contract

The following list briefly outlines the scope of works and is subject to alterations at the discretion of the client:

1. Obtain way leave permits and all relevant construction permits for construction works on the site.
2. Supply and conduct adequate dust suppression at all relevant areas during all phases of construction to inhibit the actuation of airborne asbestos.
3. Construct temporary works as required by the contractor to access the various areas of the sites. **The temporary access must be designed and signed off by a registered Professional Engineer. The Contractor must provide the**



design of the temporary access and construction method statements for the temporary access prior to Commencement of the Works. Thereafter, the Employer's Agent will accept or reject the proposed design.

4. Provide adequate signage creating awareness of construction activity as well as indicating the presence of heavy machinery.
5. Remove asbestos material from site, consolidate on waste rock dump and cap as per specification.
6. Demolish existing buildings and infrastructure on site, including foundations and related items.
7. Supply, construct and establish temporary infrastructure to access waste rock dumps, adits, shafts and other mining infrastructure that has to be rehabilitated. Alternative temporary infrastructure (cables, conveyors, etc.) other than those proposed by the Employer's Agent should be considered to convey material. The alternative temporary infrastructure must be designed and constructed by the contractor. Responsibility of the design, construction, integrity and approval of any static or dynamic structures required shall be that of the contractor. Approval of designs shall be by a registered professional engineer.

The rates tendered by the Contractor shall include all costs for temporary works.

8. Ensure the removal of all temporary works and the rehabilitation thereof, such that the site is restored to its original condition and is inaccessible.
9. Clear and grub areas around the dumps required for access.
10. Clear and grub areas demarcated for earthworks; Stockpile viable topsoil material for re-use. Stockpile viable organic material for re-use.



11. Haul material from small waste rock dumps to be consolidated in larger dumps as per contractors preferred methodology.
12. Excavations, Cut to Fill, reshaping of dumps, to be conducted as shown on the drawings, to maximum slope and provide a smooth and even surface.
13. Excavation, shaping, surface preparation and compaction of trenches as specified to be conducted on the perimeter of the dumps as shown on drawings for the placement of gabions and rip rap.
14. Supply and install geofabric in the gabion wall trench as shown on drawings.
15. Supply, fill, installation of gabion basket wall as per drawings.
16. Excavation, shaping, surface preparation and compaction of storm water trenches as specified as shown on drawings for the placement of rip rap.
17. Supply and install geofabric in the storm water channels as shown on drawings.
18. Supply, fill, installation of rip rap storm water channels as per drawing.
19. Supply and vegetate topsoil with seeds/hydroseeding.
20. Supply, installation of Erosion Control Blanket as per supplier specification.
21. Irrigation to vegetated areas to promote plant growth. Contractor to include a maintenance period into his schedule and costing for the maintenance and promotion of vegetative growth.
22. The Contractor is encouraged to use labour intensive methods as far as reasonably possible in the execution of the project. The Employer has identified items where Labour intensive methods can be implemented as such denoted as "LI" in the Bill of Quantities. Labour-intensive: refers to methods of



construction and maintenance involving a mix of labour and machines without compromising on quality, where labour is the primary resource supported by plant and equipment for activities that cannot be feasibly done by labour only.

NOTE: Due to the nature of the rehabilitation project, the Employer and Employer's Agent reserves the right to amend, make additions, and/or remove items from the above mentioned extend of works at any time before or during the contract period. Refer to sub-clause 6.3.1 of the Contract Agreement and Contract Data

PS 1.4 Location of the Works / Site Access

The mine site is approximately located at the coordinates 24°21'50.52"S and 30°17'3.03"E on the farm Streatham within the Greater Tubatse Local Municipality, approximately 45 kilometres from Burgersfort CBD and west of the Maretlwane village near the Penge Village within the Limpopo Province.

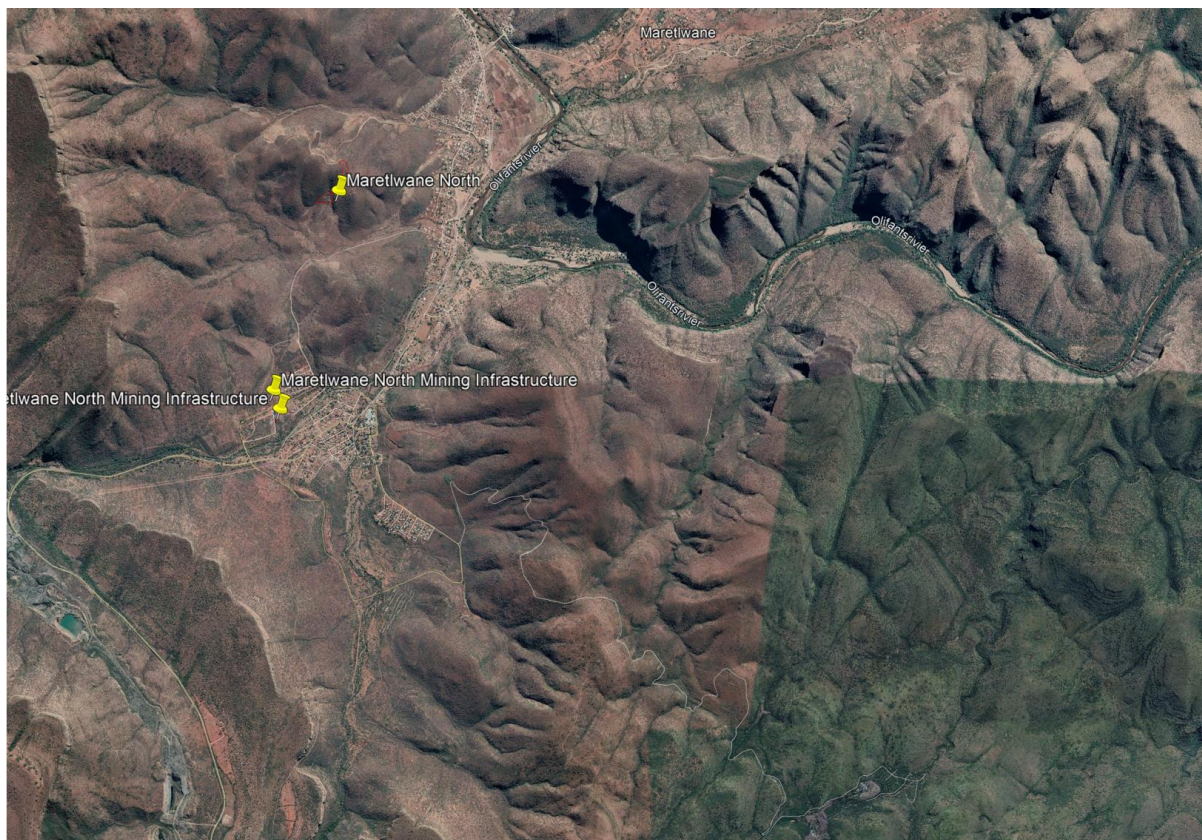


Figure 1: Maretlwane North locality map

Travel northeast from the CBD on R37 for 5.1km. Turn right onto road to Praktiseer and travel for 10km until you reach a four way stop. Turn left onto road D 2537 and travel for 28km. The site is on the left. The site can be easily accessed with a 4x2.

PS 1.5 Temporary Access

The temporary access to the various mine infrastructure must be removed upon completion of the project.

PS 1.6 Temporary Access

The temporary access to the various mine infrastructure must be constructed and removed upon completion of the project.



PS 2. ENGINEERING

PS 2.1 Employer's Design

Tenderers may not alter or amend the Employer's design however, they are free to recommend alternative construction materials and technologies provided that it is accepted by the Employer's Agent.

Acceptance of alternative construction materials or technologies shall not relieve the Contractor of any of his obligations in terms of the Contract. The Contractor's cost of preparation and submission of an alternative proposal shall be deemed to be included in the rates tendered for the execution of the Work.

PS 2.2 Intent of Specification

The Specification details the minimum requirements of the Employer and Tenderers must provide everything necessary, whether mentioned or not, to provide a satisfactory, efficient and workmanlike installation.

The tenderer shall ensure that his main offer complies fully with the minimum requirements as set out in this specification. Should the main offer not comply with this specification, this may lead to disqualification. Should Tenderers consider that deviations from or additions to the plant as specified by the Employer are necessary, these must be described and accounted for in detail as set out in Clause PS 5. Any exclusion by the Tenderer to the installation as specified shall be itemized and described in detail.

PS 2.3 Drawings

With reference to PS 2.1 above, the Drawings submitted will comprise a component of the Employer's proposed design. Drawings shall be read and understood in sufficient detail to understand the scope of the Works required to be performed. If there are areas that appear unclear or if the Contractor deems there to be material errors in the design, he shall bring it to the immediate attention of the Employer prior to the close of tenders. The Contractor is expected to address by letter any clarifications he may require in understanding



the tender document and Drawings, such that he may sufficiently price the document to complete all of the specified works.

The Drawings, forming part of this Tender, are bound into Volume 4 of this document and are listed therein. All tender Drawings must be returned at the time of tendering together with the tender documents. If the Contractor deems there to be Drawings missing, he shall inform the Employer immediately for clarification.

The Drawings included in these tender documents are intended for tender purposes only and shall not be used for construction purposes.

Only working Drawings which have been approved by the Employer's Agent and marked accordingly as follows: "APPROVED FOR CONSTRUCTION": and which have been signed and dated by him and officially issued to the Contractor for construction, shall be used on the Works.

The Contractor's attention is draw to the fact that the drawings issued at Tender faze are Tender drawings. Drawings issued for construction shall only be issued to the Contractor once the areas are cleared of all vegetation and the baseline survey is completed. The Design Engineer requires at least 21 days to complete the Construction Drawings after receiving the baseline survey from the Contractor. The Contractor shall make provision in is programme for this phase of the project.

The Drawings will remain in the sole custody of the Employer's Agent. Two A0 copies thereof will be furnished to the Contractor free of cost, but any further copies shall be paid for by the Contractor. The Contractor shall give reasonable notice in writing to the Employer's Agent of any further drawings that may be required for the execution of the Works.

One copy of the Drawings furnished to the Contractor, as aforesaid, shall be kept by the Contractor on the Site, and shall at all reasonable times be available for inspection and use by the Employer's Agent and his representatives appointed in terms of Clause 3 of the GCC (2015).



Where the design of part of the Works is done by the Contractor, he shall, unless otherwise directed, submit paper prints, in triplicate, of all plans or Drawings of such works to the Employer's Agent whose written approval must be obtained before the work concerned commences.

Scaled dimensions are not to be used, and where no figure dimensions are given on the Drawings or in the Bill or any specifications, the Employer's Agent is to be requested in writing for an instruction regarding the correct dimensions.

The Contractor shall, in accordance with the Employer's Agent's written instructions, maintain a register on site of all Drawings and revisions thereof in the chronological order in which they are delivered to him.

The Contractor shall timeously and carefully examine all Drawings and shall immediately notify the Employer's Agent in writing of any errors, inaccuracy, discrepancy or inconsistency detected by him, or raise an objection thereto in order that it may be rectified or decided upon without disruption or delays to the progress of the work.

In addition to the above PS 2.3, GCC (2015) Clause 5.9 will apply, including Clause 1.3.5 referring to copyrights.

PS 3. PROCUREMENT

PS 3.1 Preferential Procurement Procedures

Please refer to Form 10 Empowerment and Preferential Procurement, page RD.21.

PS 3.2 Subcontracting

In addition to GCC (2015) Clause 4.4 and Form 6.1 of Special Conditions, the following shall apply;

The Contractor shall not enter into any subcontract agreement without the prior written approval of the Employer, which approval will not unreasonably be



withheld. The Subcontractor, in respect of whom approval is so granted and his employees or workmen shall for all the intentions and purposes of the Contract be deemed to be workmen of the Contractor, as provided in Clause 4.4 of GCC (2015).

Approval given in terms of subcontracting shall not relieve the Contractor of any responsibility, duty or obligation imposed upon him by the Contract, and the Contractor shall in particular be and remain solely liable and responsible for all acts, omissions, negligence or breaches of contract on the part of the assignee or any of his employees, and for all acts, omissions or negligence of any subcontractor or any of his employees.

The Contractor shall entered into a sub-contracting or service provider agreement with the appointed Sub-Contractor or Service provider. The contract shall include but limited to the following:

- Working hours
- Payment Conditions
- Standing Time

PS 3.3 Purchasing of Equipment

The Contractor is required to purchase the materials and equipment necessary for the Contract at the earliest possible date thus limiting the effect of inflation. The Contractor must strive to procure materials and equipment locally.

Payment for materials and equipment will only be effected if the Contractor can prove ownership of the items.

PS 3.4 Bill of Quantities

The prices quoted in the Bill of Quantities shall cover the cost of all work required for the execution of the Contract and each price shall be considered as the full value of the work described in each item and as covering all contingent expenses.



PS 3.5 Bonds and Guarantees

Security in the amount equal to ten (10) per cent of the contract price shall be provided by the Contractor for the due and faithful performance by him of all the duties and obligations resting upon and assumed by him in terms of the Contract.

Such security shall be in the form of a deed through lodging a bond of suretyship furnished by an approved bank, insurance or guarantee corporation in such form as may be prescribed by Mintek, provided however that the Employer's Agent may, upon written application by the Contractor, return to the Contractor the whole or part of such security held by Mintek. The Employer's Agent will, subject to his sole discretion, consider what he deems sufficient for the protection of Mintek, and is entitled to hold all or a portion of the security until the completion of the Contract and the expiry of the defects liability and Defects Liability Period.

PS 4. CONSTRUCTION

PS 4.1 Applicable SANS 1200 Standards (Civil)

Although not bound in or issued with this document, the SANS 1200 Standardized Specification for Civil Engineering Construction as approved by the Council of the South African Bureau of Standards shall apply to this Contract. The Contractor shall be in possession of these Standardized Specifications and their related SANS 0120 Code of Practice, which apply equally and shall keep a copy of each on site for reference by him and the Employer's Agent for the duration of the Contract.

PS 4.2 Additional Specifications

Civil

Refer to Portion 2: Variations and Additions to the Standardized Specifications and Portion 3: Particular Specifications both of this Volume 2.



PS 4.3 Plant and Materials

All materials intended for the purpose of this Contract shall bear the approval of the relevant SANS specifications. Any deviations there from shall be recorded and reported by the Contractor for approval by the Employer's Agent.

Mintek shall have the right to refuse acceptance of any material or workmanship which is found to be unsound, damaged or contrary to the specification, or which is found during the Defects Liability Period or during tests in situ to be defective or in any way contrary to the specification due to causes within the Contractor's control or responsibility. All material or construction rejected by the Employer's Agent shall be replaced or repaired by the Contractor at his own expense to the satisfaction of the Employer's Agent, whose decision with regard to this matter shall be binding on the Contractor.

PS 4.4 Construction Equipment

In addition to GCC (2015) Clause 7, no plant will be supplied by the Employer, however the Employer does reserve the opportunity to negotiate with the Contractor that different plant be used of another origin for whatever purpose that may become apparent at the time.

In so doing the Contractor shall supply and use suitable and sufficient construction plant, tools, equipment and material as may be required to carry out the Works efficiently. Only the construction plant, tools, equipment and material which are required for this purpose shall be brought onto the Site and shall be stored, stacked or erected in such a way as not to interfere with other work or traffic. The Contractor shall furnish statements showing details of construction plant, tools, equipment and material employed or used on the Works on a day to day basis, the Daily Site Diary indicating types, numbers, quantities, hours worked, idle time, etc. all as stipulated in the Project Specification or as directed by the Employer's Agent.



Construction equipment shall be suited for the onsite intended use and shall conform to all relevant safety aspects required by the Mine Health and Safety Act Purchasing of Equipment.

PS 4.5 Existing Services

The Contractor shall make himself acquainted with all existing services. Under no circumstances shall the Contractor alter or in any way interfere with underground services unless authorised by the Employer's Agent.

The Contractor will be held responsible for damages to any existing services and any damages caused shall be made good at his own cost without delay.

The Contractor is to exercise care when the proposed work is to cross an existing service, or work is to be performed close to an existing service. Prior to commencement of the relevant portion of the proposed works the Contractor with the Employer's Agent or his duly appointed representative shall also perform a visual inspection of the area in question. This inspection will not waive the Contractor of his obligations with respect care of the works referenced in GCC (2015), Clause 8.2.

PS 4.6 Site Establishment, Facilities Available and Required

PS 4.6.1 Water Supply for Construction Purposes

The Contractor is responsible for sourcing a constant supply of clean potable water for the duration of the Contract. All costs for the provision of water shall be priced in full under the relevant scheduled items.

Note: The site is located in a water scarce area. The Contractor needs to identify where water will be sourced from and price the scheduled items accordingly.



PS 4.6.2 Power Supply for Construction Purposes

The Contractor is responsible for sourcing electricity for the duration of the Contract. All costs for the provision of electricity shall be provided in full under the relevant scheduled items by the Contractor.

PS 4.6.3 Site Office, Store and Housing

The Contractor must make the necessary arrangements with Mintek to obtain access for the vehicles and personnel he intends to employ on site.

The Contractor shall employ security staff to provide security services to his site camp and other storage areas. The Contractor will not be allowed to cut down any trees or to make any excavations on the sites for the storage yard and temporary buildings without the written permission of the Employer's Agent.

No housing for the Contractor's employees on site is permitted under any circumstances. Therefore, the Contractor shall make his own arrangements to house and transport contracting staff. On completion of the Works, or when ordered by the Employer's Agent, the Contractor shall remove all temporary buildings and latrines and restore the Site to a clean and sanitary condition to the satisfaction of the Employer's Agent and rehabilitate the area in accordance with the EMP.

PS 4.6.4 Crane and Lifting Equipment

Crane and lifting equipment is not available on the site.

PS 4.6.5 Telephone Facilities

The Contractor will be responsible for arranging his own telephone facilities and will be responsible for all costs relating thereto.



PS 4.6.6 Ablution Facilities

Ablution facilities are not available on site. The Contractor shall therefore make the necessary arrangement to provide these facilities. Chemical serviced toilets shall be the minimum acceptable standard as indicated in the Environmental Specifications. These must be placed in a position to be approved by the Employer's Agent. The facilities must be to the Employer's Agent's approval and must be maintained in a clean and sanitary condition.

PS 4.6.7 Storage Facilities

Mintek has no storage facilities available for use by the Contractor who must make his own arrangements in this regard.

PS 4.6.8 Provision of decontamination facilities

The Contractor should provide decontamination facilities installation, wash bays and the like for specific safety requirements for working in an Asbestos area.

PS 4.7 Site Facilities Required

PS 4.7.1 Facilities for the Employer's Agent

No special facilities are required by the Employer's Agent. However, the conservancy tank will be required to be emptied on a regular basis by the Contractor. A BoQ item has been provided for this work.

PS 4.8.1.1 Name boards

Two name boards shall be erected and comply with the Employer's requirements. The Name boards shall be erected within a month from the Letter of Award.

No other name board other than those stated above shall be allowed. The Contractor shall remove the boards from the Site of Works on completion of the Contract.



PS 4.8.1.2 Protective Clothing for Employer's Agents

The Contractor shall provide disposable overalls and FFP2 dusk masks of acceptable quality for the exclusive use of the Employer's Agent and his staff for the duration of the contract, subject to approval by the Employer's Agent.

PS 4.8.1.3 Protective Clothing

The Contractor shall provide three sets of personal protective overalls including jackets and gloves and one pair rubber/safety boots of acceptable quality for the Contractor's employees and labourers. The protective clothing utilised by the Contractor must take cognisance of the asbestos on site and the possibility of it being airborne.

PS 4.8.1.4 Provision and disposal of disposable PPE

The Contractor shall provide adequate disposable overalls, gloves and FFP2 dusk masks of acceptable quality of acceptable quality for the Contractor's employees and labourers for the duration of the contract. This will be subject to approval by the Employer's Agent. The protective clothing utilised by the Contractor must take cognisance of the asbestos on site and the possibility of it being airborne.

PS 4.8.2 Facilities for the Contractor

The Contractor will be permitted to establish a stores yard and to erect presentable temporary buildings for the storage of materials and for offices and latrines, all of which shall be neatly fenced. The fence must be sturdy, covered with diamond mesh wire and fitted with a lockable vehicle entrance gate and shall be at least 2 m in height.

The Contractor shall make his own arrangements to secure the facilities provided.



No employees, apart from a security guard, may be housed on the Site of the Works. The Contractor must make the necessary arrangements with Mintek to obtain daily access for the vehicles and personnel he intends to employ on site.

The Contractor will not be allowed to cut down any trees or to make any excavations on the sites for the storage yard and temporary buildings without the written permission of the Employer's Agent.

Upon completion of the work in terms of this Contract, the site must be cleared of all structures, concrete slabs and waste. The area is to be rehabilitated according to the Specification.

The tendered sums for as scheduled by the Employer's Agent, whether grouped or individually, shall include all costs for the installation, maintenance and removal of the fencing as specified, in addition to all other facilities specified and as required by the Contractor for his own purposes..

PS 4.8 Site Usage

All traffic on Site shall be restricted to the maximum speed of 40 km/h and vehicles must be driven by licensed drivers with extreme caution.

The Contractor shall be required to report daily to the Employer's Agent's personnel on the Works.

The Contractor's staff shall be identified by either clothing or an identification tag, which shall be displayed when entering the Site of Works.

PS 4.9 Permits and Wayleaves

Work permits for areas of the Works in operation shall be obtained from the Mintek and completed and shall be area specific, e.g. working in a specific area.



No way-leaves are envisaged under the Contract. The Works called for under this Contract shall be executed on existing structures within the Works Site boundaries.

PS 4.10 Water and Electricity for Construction Purposes

The responsibility lies solely with the Contractor to obtain electricity and water supply for the site. All costs for the provision of water and electricity will be paid by the Contractor.

PS 4.11 Survey Control and Setting out of the Works

The Contractor shall be responsible for the construction of survey beacons and the setting out of the Works in accordance with the co-ordinates indicated on the construction drawings.

PS 4.12 Accommodation and Care of Employees

Housing

No employees, apart from a security guard, may be housed on the Site of Works. the Contractor shall make his own arrangements to secure the facilities provided for under the Contract.

The Contractor must make the necessary arrangements with Mintek to obtain daily access for the vehicles and personnel he intends to employ on site.

PS 4.13 Temporary Housing, Stores, etc.

The Contractor shall provide and maintain at his own cost all sheds of a temporary nature necessary for the accommodation and proper protection of plant and equipment from damage or loss. These are to be erected only on sites which shall have been approved by the Employer's Agent and they shall be removed as soon as their necessity ceases and the site thereof restored to its original condition and the ground left clean and sanitary.



PS 4.14 Management Meetings

Meetings will be held every month with the first meeting called the site handover meeting. The Contractor will be supplied with an appropriate agenda for the management meetings and meetings will be chaired by the Employer's Agent or his duly appointed representative. The Employer's Agent or his duly appointed representative will be responsible for issuing of the minutes.

PS 5. MANAGEMENT OF THE WORKS

PS 5.1 Applicable SANS 1921 Standards

Although not bound in or issued with this document, the following SANS 1921 Construction and Management Requirements for Works Contracts as approved by the Council of the South African Bureau of Standards shall apply to this Contract. The Contractor shall be in possession of these Standards and shall keep a copy of it on site for reference by him and the Employer's Agent for the duration of the Contract.

SANS 1921 Part 1: General Employer's Agenting and construction works

SANS 1921 Part 5: Earthworks activities which are to be performed by hand

SANS 1921 Part 6: HIV/AIDS awareness

These Specifications are not issued with this volume but are available at the Contractor's expense from: Standards South Africa. Details are given in Section PS 4.1 above.

PS 5.2 Planning and Programming

An initial programme in terms of the GCC (2015) Clause 5.6, complete with a cash flow budget for the execution of the works must be made available to the Employer's Agent for approval within 21 days after the receipt of the Letter of



Award. Aspects that will require co-ordination with the Employer must be indicated clearly and provision must be made for it in the programme.

No work of a permanent nature may be executed before the programme has been approved by the Employer's Agent.

It will be an explicit requirement of the contract that this program is updated monthly and submitted to the Employer's Agent at least two working days prior to the monthly site progress meeting.

The Employer's Agent retains the right to alter, as circumstances may require, the sequence in which installation is to be executed. Such alterations will only be made after consultation with all parties concerned.

In drawing up the programme, reference shall be made to clauses PS 1.3 and 3.2. Also allow for the stipulation that the new works as a whole must be fully operational for an uninterrupted period of 14 days before the equipment will be considered as being successfully installed and commissioned.

PS 5.3 Sequence of the Works

The Contractor shall supply his proposed sequence of work together with the initial programme.

PS 5.4 Software applications for Programming

The Contract programme is to be completed using Microsoft Office Project software. It shall show the activities planned start dates, planned end dates and planned durations.

The programme shall be costed in accordance with the Bill of Quantities and resourced accordingly.



PS 5.5 Methods and Procedures

The Contractor will advise in his tender the methods and procedures that he proposes in performing the Works. These methods and procedures shall not be deemed as terms of the Contract. The Contractor is also allowed to change his methods and procedures as he sees fit subject to the change being approved by the Employer's Agent. Methods and procedures will not vary the specification and cannot be used to provide qualifications to the proposed agreement. The intention of the method statement is to provide the Employer's Agent and the Employer with information as how he proposes to perform the said works.

PS 5.6 Quality Plans and Control

Refer to the GCC (2015) Portion 7. In addition to this, the Contractor will furnish the Employer's Agent with a Quality Assurance and Control Plan that incorporates all of the requirements of this specification within three weeks of the Letter of Award of the contract.

All material, plant and equipment shall be of the best quality available and shall, where applicable, comply with the relevant standard specifications of the SANS. In cases where no specification of the SANS exists, the relevant British, German or American specifications will be applicable as determined by the Employer's Agent. The latest amendments of these specifications shall apply.

The Contractor shall submit for the approval of the Employer's Agent and before any orders are placed, the names of the firms from which he proposed to obtain his supplies of materials and manufactured articles.

He shall also supply samples as and when required by the Employer's Agent. The Employer's Agent may also, in exercising the powers vested in him, order the Contractor to remove all or any of the material and equipment which, in his opinion, is of an inferior quality and to replace them with proper materials or equipment at his own expense.



PS 5.7 Testing, Completion, Commissioning and Correction of Defects

Workmanship, tolerances and frequency of testing are to be in accordance with relevant specifications.

The Employer reserves the right to appoint independent testing laboratories to monitor the results returned by the Contractor for the quality of materials and work performed.

The Contractor shall conduct his own testing as work proceeds to ensure that the necessary requirements and specifications are being complied with.

Once the Contractor is satisfied as to the completion of any stage of his work, he shall arrange for the following:

- a) Necessary measurements (survey, levels, etc.) are taken for computation of quantities.
- b) Information must be submitted to the Employer's Agent for approval.
- c) The said stage shall be tested by his own laboratory, the Employer's Agent and/or any other party requested by the Employer's Agent. This testing shall take place jointly by all the parties involved and at the direction of the Employer's Agent.
- d) Only once the measurement information and the results from the required tests have been submitted to and approved by the Employer's Agent, will the Employer's Agent issue a site instruction to proceed with the next stage.
- e) Both the Contractor and the Employer's Agent will keep the measurement information and all test results for each stage in a filing system that will enable easy access. All samples taken for testing shall be suitably referenced to enable them to be traced. This includes a dimensioned site plan where necessary.
- f) The Contractor shall arrange for each testing as described above at least 24 hours in advance. Should the Contractor fail to request an



inspection timeously and proceed with work without the Employer's Agent's approval, this will be at his own risk.

PS 5.9.1 Performance Tests

General

The Contractor shall carry out all tests required to satisfy the Employer's Agent that the material installed is as per the Specification, and shall allow for this in his Tender. Any defects detected during the testing operation shall be made good by and at the expense of the Contractor, including all additional costs incurred by the Employer and his representatives and the Employer's Agent.

The Employer's Agent will be entitled to be present at such test and the Contractor shall give the Employer's Agent reasonable notice of the dates of the test.

Tests on Site

All Site tests shall normally be carried out in the presence of, but always to the satisfaction of the Employer's Agent and at such times as he may reasonably require. The Contractor shall provide all the relevant test equipment and bear the costs of all testing to be done. All equipment must be tested to ascertain whether it performs its intended duties in a manner as specified.

Accepted Laboratories

Unless otherwise stated in a specification that forms part of this Contract, only the testing laboratories of the South African Bureau of Standards, the Council of Scientific and Industrial Research, the relevant Government Departments and Local Authorities will be accepted as approved laboratories in which tests or design work required in terms of a specification may be carried out.

Methods of Testing



Unless otherwise prescribed in a specification that forms part of this Contract, all testing shall be carried out and interpreted in strict accordance with the methods specified in relevant SANS, IE or BS Specification(s).

PS 5.8 Extension of Time Due to Inclement Weather

Introduction

No extension of time will be granted for delays arising out of 'normal' unfavourable climatic conditions.

The Contractor shall be responsible for keeping accurate records of weather conditions in the Daily Site Diary to use as substantiation of any claim for extension of time in accordance with GCC (2015), Clause 5.12. The Contractor will inform the Employer's Agent when he is unable to proceed with the Works in accordance with the approved Contract Program. Subject to the approval of the Employer's Agent, the rainfall and other relevant notes will be noted in the Daily Site Diary for the applicable day/s. After the event the Contractor shall provide a revised Contract Program motivating if the delay affects his schedule to the extent that he will need to motivate for an extension of time in accordance with the relevant GCC Clause. The Employer's Agent, together with the Employer, will be responsible for granting the extension of time.

Applicable Formula

Any possible extension of the Time for Completion arising from abnormal rainfall shall be calculated separately for each calendar month or part thereof in accordance with the formula below. Any extension of the Time for Completion for part of a month shall be calculated using pro-rata values of N_n and R_n .

$$V = N_w - N_n + (R_w - R_n)/20$$

If V is negative and its absolute value exceeds N_n then V must be taken as equal to minus N_n .



The symbols shall have the following meanings:

V = Extension of time in calendar days in respect of the calendar month under consideration.

N_w = Actual number of days during the calendar month on which rainfall of 10mm or more has been recorded.

N_n = Average number of days, as derived from existing rainfall records, on which a rainfall of 10mm or more has been recorded for the calendar month.

R_w = Actual rainfall in mm recorded for the calendar month under consideration.

R_n = Average rainfall in mm for the calendar month as derived from existing rainfall records.

General Provisions

The total extension of Time for Completion which may be granted shall be the algebraic sum of all monthly totals for the period under consideration.

This formula does not take account of flood damage, which could cause further or concurrent delays and should be treated separately as far as extension of time is concerned.

The factor $(N_w - N_n)$ must be considered to represent a fair allowance for variations from the average number of days during which rainfall exceeds 10mm.

The factor $(R_w - R_n) / 20$ must be considered to represent a fair allowance for the variations from the average in number of days during which the rainfall did not exceed 10mm, but wet conditions prevented or disrupted work.

Where work is being carried out under cover or not affected by abnormal rainfall or not on the critical path progress of construction, extension of the Time for Completion may be granted in terms of this formula.

REHABILITATION OF MARETLWANE NORTH ASBESTOS MINE: RE-ADVERTISEMENT
(MTK 19/2022)



Volume 2

Part 3: Scope of Work

The following information regarding existing rainfall records obtained from a rainfall station near the Site, is given below:

Information Centre: Mintek (Pty) Ltd, Randburg

Tel: 011 714 4423

Rainfall District: Burgersfort

Period: 1971 – 2017

MONTH	Nn (days)	Rn (mm)	MONTH	Nn (days)	Rn(mm)
January	2.9	93.5	July	0	2.4
February	2.3	74.5	August	0.3	6.2
March	1.8	56.7	September	0.5	11.8
April	1.2	30.5	October	1.7	50.5
May	0.1	6.2	November	3	85.9
June	0.1	4.4	December	3	88.9
Yearly Average					43



PS 5.9 Format of Communications

All instructions to the Contractor will be in writing and shall be deemed to have been received if left with the Contractor or his agent at the site of the Works or at the business premises of the Contractor.

The format of the letters, invoices etc, will be determined and agreed at the first site meeting

A Daily Site Diary shall be used by the Contractor for recording day by day the state of the weather, the work done each day and full details of any circumstance which may affect the progress of the works. One original sheet and two copies shall be used for each day. The original sheet of each set of 3 pages will be retained by the Employer's Agent or his representative. The Contractor may remove the second sheet but the third sheet shall be retained on the site until completion of the Works, when it shall be handed over to the Employer's Agent.

PS 5.10 Key Personnel

The Contractor is deemed to have in making his offer, all personnel available to perform the works entirely in the contracted time and cost. In addition he shall comply with the prevailing Act 29 of 1996, Mine Health and Safety Act.

Tenderers shall state, in the format of a schedule, the posts for which he shall consider key personnel for the Site of Works. The number of such key personnel occupying the Site shall not be required at the tender stage. The Contractor, once formally requested by the Employer's Agent, shall make available the contact details of all the key personnel on site.

The Employer's Agent and his duly appointed representative will be the key contacts on Site.



PS 5.11 Management Meetings

Monthly Progress Meetings will be held with the first meeting called the site handover meeting. The Contractor will be supplied with an appropriate agenda for the progress meetings and the meetings will be chaired by the Employer's Agent. The Employer's Agent will be responsible for issuing of the minutes.

PS 5.12 Forms for Contract Administration

The Contract will be managed by, but is not limited to, site instructions, letters, minutes of meetings and quality forms signed by the Employer's Agent as stated in the GCC (2015), Clause 3.2.

PS 5.13 Daily Records

The Contractor shall be required to keep a Daily Site Diary recording all on-site activities. The records shall include all material deliveries for the day, personnel employed on the Site of Works, the number of man-hours for the week in question, equipment delivered to site or storage and Plant used during the on-site activities and all other relevant information.

It is important that the Contractor's record is of sufficient detail and is absolutely accurate. A proforma Daily Site Diary of which three sheets will be used for each day will be supplied by the Employer's Agent or his Representative. In addition Clause PS 5.14 and Clause PS 5.11 shall also apply.

The Daily Site Diary report shall be submitted to the Employer's Agent's Representative on a daily basis for verification.

PS 5.14 Bonds and Guarantees

Guarantees shall be delivered to the Employer with a copy to the Employer's Agent in accordance with the GCC within the time stated in the Contract Data Sheet.



PS 5.15 Payment Certificates

Monthly payment certificates shall be submitted by the Contractor in the format approved by the Employer's Agent. Once an agreement has been reached with the Employer's Agent on the value of the certificate, the Contractor shall submit an original invoice on which payment will be made. The format will be discussed in the month preceding the first claim and will be resolved before the first payment is made.

The Contractor shall submit with each monthly payment certificate the following documentation:

1. Supporting documents in the form of a survey report, calculations, and measurements
2. Any other proof to substantiate the value of the certificate
3. EPWP reports

Payment for particular items scheduled shall conform to the applicable payment clauses of the Pricing Data, Project Specifications and the Particular Specifications.

Where retention money is applicable to a Contract, the retention money shall be deducted on the invoice from the total amount for work done and then the Value Added Tax (VAT) added to calculate the total amount payable on the invoice.

If penalties are payable, they will be deducted prior to the addition of (VAT) but after the calculation of retention.

Tax invoices shall be submitted for each interim payment claim. The Contractor shall submit a provisional invoice with his payment claim as soon as possible after the date of measurement.

Payment Certificates shall be delivered to the Employer's Agent by the 15th of each month. Payment Certificates must be accompanied with the mandatory EPWP report and Local Value Addition reports. Failure to submit the reports shall



result in the non-issuing of the Interim Payment Certificate by the Employer's Agent.

PS 6. FEATURES REQUIRING SPECIAL ATTENTION

PS 6.1 General Conditions of Contract (GCC)

The Contract Document is compiled in accordance with the General Conditions of Contract for Works of Civil Engineering Construction, Third Edition (2015) and Tenderers are therefore required to price the Tender accordingly.

PS 6.2 Security

The Contractor shall make his own arrangements to secure any on-site facilities provided for the execution of the Contract.

PS 6.3 Work Outside Normal Working Hours

This must be read with Clause 5.8 of the General Conditions of Contract (GCC 2015). The Contractor shall pay to the Employer an amount of R500.00 per hour per person needed for supervision by the Employer's Agent when construction work is carried out outside normal working hours, except in the case as set out in Clause 5.10 of the General Conditions of Contract.

PS 6.4 Contract Award

The Contract shall be awarded to one main Contractor. It is an explicit requirement of this Contract that the work of the various disciplines be executed by competent staff and/or Sub-contractors. The Contractor will be responsible for the coordination of his own work and that of any sub-contractors.

PS 6.5 Additional Meetings

The costs of all additional meetings or inspections over and above the normal, that take place because of the Contractor not keeping to his program or because of the quality of his work will be for the account of the Contractor and will be



deducted from the following payment certificate. An amount of R5 000.00 per meeting will be paid by the Contractor to compensate for the travelling cost, time, etc. of both the Employer's Agent and the Employer.

PS 6.6 Sanitary Facilities

The Contractor shall provide his own sanitary facilities. No existing sanitary facilities are to be tampered with.

PS 6.7 Community Liaison and Community Relations

The Contractor in consultation with the local community shall be responsible for employing the Community Liaison Officer from the local community. The Contractor may be required to participate on a project steering committee.

PS 6.8 Local Labour

The Contractor's attention is drawn to Form 6.1 Special Conditions of Contract Page RD.13.

PS 7. CONTRACTORS MANDATORY TENDERING REQUIREMENTS

Refer to Volume 3, Part 4: Site Information

PS 8. ENVIRONMENTAL MANAGEMENT PLAN

Refer to Volume 3, Part 4: Site Information



PORTION 2: VARIATIONS AND ADDITIONS TO THE STANDARDIZED SPECIFICATIONS

The following variations and additions to the SANS 1200 Standardized Specifications will be applicable to this Contract.

The Clauses and pay items in this portion of the Project Specification are numbered “PS” followed by a number corresponding to the number of the relevant clause or pay item in the Standardized Specifications or numbers following on the last item in the Standardized Specifications.

SANS 1200A: PRELIMINARY AND GENERAL

PSA 3.3 MATERIALS SUPPLIED BY OTHERS

Where materials are supplied by others, the Contractor shall take delivery of such materials on site and shall be responsible for the safekeeping of the same from the time of taking delivery to the time of building into the Works or the time of return to the supplier. The Contractor shall return to the supplier any materials not used on the Contract.

PSA 4.2 CONTRACTOR'S OFFICES, STORES AND SERVICES

Add the following:

The Contractor shall make the necessary arrangements with the relevant authority for the provision of services such as electricity and water for domestic and/or construction purposes.

The electrical wiring of all buildings shall be carried out by registered and licensed electricians in accordance with the requirements of SANS 0142 and the regulations of the local authority.

The Contractor shall not be obliged to make use of local water and electricity services and shall be at liberty to obtain them from approved alternative sources.



Should the Contractor make use of local services, he shall make arrangements, where applicable, for connections to be made, complete with meters, from these services for use at the Site. All costs incurred in respect of these connections and the meters, pipes, cables, etc. from the connections to his facilities, the cost of the water consumed, the cost of the removal of sewage (not chemical toilets), and the cost for finally disconnecting and removing the services shall be paid by the Contractor, who shall include full compensation for such costs in his tendered rates for the various items of work requiring the use of one or more of the services. The Contractor shall furnish the Employer's Agent with documentary proof that proper notice has been given to the relevant authority for termination of the services.

The Contractor's camp shall be kept neat and clean at all times and all surplus or rejected material shall be removed from site immediately.

The Contractor under this Contract shall supply his own distribution board for distributing the power to his facilities. He shall be responsible for distribution of power and water supply to other mechanical and electrical Contractors on the Site. Payment for these services to other Contractors shall be arranged between the Contractor under this Contract and the other Contractors. The Employer will not be involved in any arrangements in this regard.

The Contractor shall deliver to the Employer's Agent a detailed drawing of the proposed layout of his offices, stores and services before erecting same.

Sufficient backup services shall be provided to ensure the uninterrupted execution of the Works such as storage tanks for water for use in the mixing of concrete, standby electrical power for work at night and for electrical plant and equipment used on Site.

PSA 5. CONSTRUCTION

PSA 5.1.1 SETTING OUT OF THE WORKS

The following shall be added:



An item has been provided in the Bill of Quantities for the setting out, construction, surveying of survey beacons, and any other survey as directed by the Employer's Agent. Where a control point is likely to be disturbed during construction, the Contractor shall apply to the Employer's Agent for its re-establishment at a location where it will not be disturbed during construction. Contractors are to satisfy themselves that the control points shown on the drawings are sufficient to enable them to set out the works properly. If additional control points are considered necessary, Contractors are required to provide details of the number and location of additional control points required.

Should the Contractor cause displacement of any control point, the costs of repositioning shall be borne by the Contractor.

No separate payment will be made for lower level setting-out points, the costs of which are to be included in the rates tender for the appropriate scheduled items of work.

PSA 5.7 SAFETY

Add the following:

1. The Contractor shall at all times observe adequate safety precautions on Site to ensure the safety of his own staff as well as that of the public and other persons engaged in or about the Works. In this respect he shall observe all laws, ordinances and regulations pertaining to his work.
2. The Contractor's attention is specifically drawn to the following Acts, and particularly to the relevant regulations under each Act, copies of which shall at all times be kept by him on the Site:
 - The Explosives Act (Act 26 of 1956)
 - The Mines and Works Act (Act 27 of 1956)
 - Mine Health and Safety Act (Act 29 of 1996)



- The Occupational Health and Safety Act (Act 85 of 1993)
 - The Asbestos Regulations (GNR 155,2002)
 - Disaster Management Act (Act 57 of 2002)
3. The Contractor is also required to comply with the safety precautions set out in the following publications, copies of which shall also be kept by him on the Site:
- The Code of Practice relating to the safety of men working in civil Employer's Agenting inspection pits and small-diameter vertical shafts. (Transactions of the South African Institution of Civil Employer's Agents, Vol. 2, No. 11, November 1960, obtainable from the Secretary, S.A. Institution of Civil Employer's Agents, Private Bag X200, Halfway House, 1685).
4. The Contractor shall provide suitable and safe access by way of ladders, gangways, etc. to all parts of the Works as may be required for construction purposes or for inspection by the Employer's Agent or the authorised Inspectors in terms of the above mentioned Acts.
5. All precautions shall be taken to protect workmen against falling material and/or objects and other dangers whilst they are carrying out their duties. Shaft and trenches shall in every way be made and kept safe for persons working therein.
6. All persons working, inspecting or supervising in places where falling material and/or objects could be encountered shall be provided by the Contractor with hard hats of a type approved by the Inspector of Mines, the use of which shall be strictly enforced.
7. The Contractor shall provide a properly equipped first aid box, which shall be accessible at all times.



8. Where adequate safety precautions are not being observed, the Employer's Agent may order the Contractor to comply with minimum safety requirements at the latter's expense. Compliance with such order will not absolve the Contractor from any of his responsibilities and obligations under the Contract.
9. The Contractor shall display on a prominent place the following emergency information:
- Local Police Telephone number
 - Local Ambulance Telephone number
 - Local Fire Brigade Telephone number
 - Nearest Doctor Name
Telephone number (office hours)
Telephone number (after hours)
Consulting room street address

PSA 8 MEASUREMENT AND PAYMENT

PSA 8.2.2 Time-Related Items

The following shall be added:

In the event that the net total extension of time granted in terms of the Contract and/or delay in the anticipated date of award of the Contract results in the official date for completion extending into or past a Christmas Builders Holiday period which did not fall within the tendered period for completion based on the anticipated date of award, and extension of time equivalent to the number of normal working days falling within that holiday period shall reduce to 25% of that applicable in terms of the above. It should be noted that time-related charges for the Christmas Builders Holiday period falling within the tendered period for completions based on the anticipated date of award of the Contract



will be paid for at the full rate since such holidays are to be included in the tendered period for completion.

The anticipated date of award referred to above shall be the date stated in the Contract Documents. If the date is not stated it shall be considered to be any date within the period of validity of the Tender.

PSA 8.3 Scheduled Fixed-Charge & Value Related Items

PSA 8.3.1 Contractual Requirements

Add the following:

The Contractor shall be required to produce a copy of their Workplace Skills Plan and an Implementation Report to CETA

PSA

8.3.2.2(g) Water supplies, electric power and communications

The contractor shall be responsible for sourcing potable water and electricity to site for the duration of the Contract. The tendered rate will contain all associated costs providing electricity, testing of water, provision of water to the site and labourers.

PSA 8.3.3 Tendered Sums for Payment Reference 8.3 and 8.4 & 8.3.4

Should the total sum tendered for Payment References 8.3 and 8.4 exceed 25 percent of the total Tender Sum less any allowances provided for sums stated provisionally by the Employer's Agent, Contingencies and Contract Price Adjustment, the Tenderer shall clearly set out his reasons for tendering in this fashion in a letter accompanying his tender. The employer will take due consideration of these reasons, but reserves the right to consider the sum tendered for these items to be inconsistent with the remainder of the tender, and such consideration may render liable for rejection.



PSA 8.7 Daywork

Replace this clause with the following:

PSA 8.7.1 Expenditure on Daywork Items (i.e. Wages paid to workmen and invoices of cost of materials delivered on site)

Unit: Provisional Sum

PSA 8.7.2 Extra over item PSA 8.7.1 for supervision, overheads and all other costs related to the Daywork items under item PSA 8.7.1 for the following:

- | | | |
|----|---------------------|--|
| a) | Skilled artisans | Unit: Percentage of provisional sum (%) |
| b) | Unskilled Labourers | Unit: Percentage of provisional sum (%) |
| c) | Material | Unit: Percentage of provisional sum (%) |

PSA 8.7.3 Plant Hire Rates (Types and sizes indicated) **Unit: hours (hrs)**

a) Labour

The labour charges to be reimbursed under the Daywork item PSA 8.7.1 in the Schedule of Quantities shall be the actual amount of wages paid to workmen, chargehands and gangers, (but not foremen), employed on Daywork with the authorisation of the Employer's Agent. The labour charges will be paid only for the time that the workmen are actually so employed on Daywork.

Leave pay, bonuses, subsistence allowances, employer's contributions to medical schemes and provident funds and the like shall not be included in the above mentioned labour charges but will be deemed to be covered by the



percentage rate tendered by the Contractor against the items PSA 8.7.2(a) and PSA 8.7.2(b) scheduled for this purpose under Daywork in the Schedule of Quantities.

This percentage rate shall also be deemed to allow for the use of small tools, supervision, insurances, overhead expenses, transport of workmen, housing and feeding (if the liability of the Contractor) profit and any other expenses in connection with workmen employed on Daywork and shall also include for everything else covered under the allowances as stated in Clause 37.2 of the General Conditions of Contract.

b) Materials

The material charges to be reimbursed under the Daywork item PSA 8.7.1 scheduled in the Schedule of Quantities shall be the invoiced cost as approved by the Employer's Agent, less any discount granted by the Supplier. Only the actual quantities of materials used, as verified by the Employer's Agent, will be paid for.

The cost of transportation to site, storage, transportation to the point of use on site, insurance, superintendence and administrative costs, overhead expenses and profit shall be deemed to be covered by the percentage rate tendered by the Contractor against the item PSA 8.7.2(c) scheduled for this purpose under Daywork in the Schedule of Quantities. The percentage rate tendered shall also include for everything else covered under the allowances as stated in Clause 37.2 of the General Conditions of Contract.

c) Plant Hire Rates

The rates tendered for the hire of plant shall be applicable only to plant that the Contractor has on the site and shall be total all inclusive unit prices which shall include, inter alia, for all fuel and lubricants; for the wages of operators, drivers or attendants; for all tools, accessories, equipment and everything else necessary; for all depreciation, maintenance and repair costs; for overhead



expenses, profit and for everything in accordance with Clause 6.5 of the General Conditions of Contract.

The hire charges shall be paid only for the time that the plant is actually working on the Daywork as authorised by the Employer's Agent.

Payment will not be made in respect of established, fixed or static plant on the site such as static concrete batching and mixing plant, cocopan track, monorails, static generators, compressors, pumps, lighting, ventilation plant and the like which are covered under other items but which may be used for Daywork.

PSA 8.8 TEMPORARY WORKS

PSA 8.8.7 Position, construct and re-survey survey-beaconsUnit: No.

The rate tendered shall cover all work required to position, construct, level benchmarks and re-survey the survey beacons as shown on the drawings. The rate shall include for an independent check of the co-ordinates and levels of the benchmarks.



SANS 1200 AB: ENGINEER'S OFFICE

PSAB 1 SCOPE

Replace this Clause with the following:

This section covers the provision of a chemical ablution facility for the Employer's Agent on site and the maintenance thereof, services, training and PPE.

PSAB 3 MATERIALS

PSAB 3.1 NAME BOARDS

Two name boards are required.

The description of the project and the names and titles of the Employer, Employer's Agent and Contractor to be painted on the boards shall be handed to the Contractor at the start of the Contract. The name boards shall comply with the requirements as detailed on a signboard drawing provided.

The Contractor shall erect the name boards at locations indicated by the Employer's Agent while establishing himself on Site, but not later than 14 days after the start of the Contract. On completion of the Contract the Contractor shall remove the boards.

PSAB 3.2 ENGINEER'S OFFICE

Replace this Sub-Clause with the following: The Employer's Agent on site will share an office with the Contractor (this should include a chair, desk and drawing rack).

PSAB 3.2.7 Ablution units

One mobile chemical ablution facility needs to be provided **for the sole use of the Employer's Agent.**



PSAB 3.3 SERVICES

PSAB 3.3.1 Sanitary arrangements

The Contractor shall be responsible for providing all sanitary services necessary to keep the chemical ablution facilities hygienic.

The Contractor shall make provision for the removal of all domestic rubbish on a regular basis.

PSAB 3.3.2 Water and Electricity

The Contractor shall provide a constant supply of clean potable water suitable for human consumption. The tendered rate will contain all associated costs for the provision of water.

The Contractor shall be responsible for the provision of electricity. All buildings supplied shall include the provision of 220 V electricity. The tendered rate will contain all associated costs for the provision of electricity.

PSAB 3.3.3 Maintenance

The Contractor shall provide all labour, equipment and material which may be necessary to keep all accommodation in a neat and clean condition, and repairs shall be done without undue delay.

PSAB 3.4 GENERAL

- a) The Contractor shall not order any materials, equipment or fittings on the basis of their having been specified or scheduled without the written confirmation of the Employer's Agent having been obtained. No building shall be erected without the Employer's Agent's written instructions as to the exact position and orientation of the building.
- b) Unless otherwise agreed upon, the meeting room shall be erected in close proximity to the Employer's Agent's offices.



- c) The required facilities shall be completed, ready for occupation as specified, not later than three (3) weeks after the commencement date of the contract.
- d) The ownership of the meeting room, Employer's Office and the kitchen shall remain the property of the Employer at the end of the Contract.
- e) The ownership of the furniture in PSAB 3.2.1 and PSAB 3.2.3 shall remain the property of the Employer.
- f) The Contractor shall take all reasonable precautions to prevent unauthorised entry to the offices and to ensure the general security of the offices and meeting rooms.
- g) No accommodation shall be erected without the prior approval of the Drawings by all local or Government authorities requiring such prior approval.

PSAB 3.5 INSURANCE

The Contractor shall keep all the site offices, furniture and equipment insured against loss, damage or breakage and shall indemnify the Employer, the Employer's Agent and his staff against claims in this regards for the full duration of the Contract.

PSAB 4 PLANT

Not applicable to this section.

PSAB 5 CONSTRUCTION

Not applicable to this section.

PSAB 8 MEASUREMENT AND PAYMENT

Add the following pay items:



PSAB 8.3.1 Services

The provision of water, electricity, toilet and rubbish removal, cleaning services, maintenance and repairs, all as specified in Sub-Clause PSAB 3.3 of this section. Payment of the lump sums tendered shall be in full compensation for the provision of the services specified and will be payable in installments as the work proceeds, such installments to be directly proportional to the value of the work done in relation to the total contract amount, including for contingencies, unless otherwise decided by the Employer's Agent. Payment for this item shall be increased pro rata according to the time for which the services are required during any extended time of construction in respect of which extension of time has been granted.

Unit: Lump sum

PSAB 8.3.2 (a) Personal Protection Equipment

The sum tendered shall be the total inclusive lump sum for the provision of the items listed in PS 4.8.1.2 and will be payable once all the items have been delivered to Site and handed over to the Employer's Agent's Representative's staff. These items will remain the property of the Employer at the end of the Contract.

Unit: PC Sum

PSAB 8.3.2 (b) Personal Protection Equipment (3 sets for each employee)

The sum tendered shall be the total inclusive lump sum for the provision of the items listed in PS 4.8.1.3 and will be payable once all the items have been delivered to Site.

Unit: Sum



PSAB 8.3.2 (c) Provision and disposal of disposable PPE

The sum tendered shall be the total inclusive lump sum for the provision and disposal of the items listed in PS 4.8.1.4 and will be payable once all the items have been delivered to Site.

Unit: Sum

PSAB 8.3.3 (a) Community Liaison Officer (CLO)

The Contractor shall appoint a community liaison officer subject to the approval of the local community to administer the functions and requirements of clause 1.4 of the environmental Management Plan in Volume 2. Payment will be on a monthly basis for the period the CLO is employed.

Unit: P Sum

PSAB 8.3.3 (b) Stakeholder engagement activities

The Contractor shall make provision for the costs of stakeholder engagement activities such as the Project Steering Committee. This item will be for the transportation cost of PSC members, hiring of venue (where necessary) for PSC meetings, catering costs and any other related costs.

Unit: Provisional Sum

PSAB 8.3.4 Training

The Contractor shall train the local labour employed using an accredited training provider in the skills to be used on the Contract such as gabion fixing,



asbestos regulation training and any other relevant skills. Certificates shall be issued to each employee successfully completing the relevant course. The training shall be approved by the Employer's Agent's Representative in writing before commencement of training. Payment will be in installments as the training proceeds on submission of the service provider's invoice with the interim payment certificate.

Unit: P Sum

PSAB 8.3.5 Engineer's office

The Contractor shall make provision for the Employer's Agent to share an office with the Contractor. The rate should include for the provision of the office including a chair, desk and drawing rack.

Unit: Sum

PSAB 8.3.5 (f) Living accommodation

The contractor shall provide suitable rented houses, approved by the engineer which will provide allowable comfort in the nearest town or elsewhere.

The terms of any lease for such accommodation shall be subject to the engineer's approval and shall contain provision, where the owner agrees, for an extension of lease on pre-agreed terms during any extended time for completion of the contract, as well as provision for the lease to be taken over by the engineer or another contractor in the event of default or insolvency of the contractor. Notwithstanding the engineer's approval of the lease, the contractor shall be solely responsible for providing the accommodation for the full period required and for suitable substitute accommodation should the provided accommodation be no longer available.



The contractor shall make provision for daily providing engineer's staff with transport from the rented/leased/hotel arriving on the site at 07:00 and departing from site at 17:30.

Unit: Provisional Sum

(g) Telephone and communication

The contractor shall provide suitable telephone and data facilities for the assistant resident engineer, approved by the engineer and will be responsible for all costs relating thereto.

Unit: Provisional Sum

(g) Transport

The contractor shall make provision for daily providing assistant resident engineer with transport from the rented/leased/hotel arriving on the site at 07:00 and departing from site at 17:30. To be approved by the engineer.

Unit: Provisional Sum

PSAB 8.3.6 Asbestos Regulation Training

The Contractor shall train the local labour employed using an accredited training provider for asbestos regulation training. Certificates shall be issued to each employee successfully completing the course. The training shall be approved by the Employer's Agent's Representative in writing before commencement of training. Payment will be in installments as the training proceeds on submission of the service provider's invoice with the interim payment certificate.



Unit: Sum

PSAB 8.3.7 Asbestos supervisor for the duration of the contract

The Contractor shall appoint an asbestos removal supervisor as per the Asbestos Abatement Regulation 2020. The name and contact details of the asbestos removal supervisor must be included in the plan of work to be approved by the employer prior to commencement of any asbestos work as contemplated in regulation 12(3). The Asbestos Supervisor now has very specific responsibilities ensure on-site compliance for; H&S, asbestos work procedures (approved POW), use of PPE and decontamination.

Unit: months

PSAB 8.3.8 Maintenance of decontamination wash bays

The Contractor shall maintain of decontamination wash bays and the like for specific safety requirements for working in an Asbestos area.decontamination.

Unit: months

SANS 1200 C: SITE CLEARANCE

PSC 8.2.8 Demolish and remove existing brick and/or concrete structures and deposit rubble in an existing borrow pit:

(1) Storage Silos and Other Buildings

The storage silos and other buildings contains asbestos fibres. The tender rate shall include the protection of existing services, the demolishing of the



structure and, the depositing of the rubble in an existing borrow pit as directed by the Employer's Agent.

Further to the above the tender rate shall include all provisions for the safe handling, transportation, offloading and immediate capping of asbestos contaminated material in terms of the Asbestos Regulation including the air quality monitoring, the drafting and submission of a task specific method statement, and the rehabilitation of the demolished area.

Unit: Sum

SANS 1200 D: EARTHWORKS

PSD 3 MATERIAL

Add the following Sub-Clauses:

PSD 3.3 SELECTION

PSD 3.3.1 General

Add the following:

The Contractor will be required to stockpile the surplus excavated material on sites to be designated on the drawings or by the Employer's Agent.

The Contractor shall be entirely responsible for the selection of suitable material for all backfilling and embankments from excavation on the site and from borrow pits.

Importation from borrow pits of the relevant grade of material will only be permitted when all supplies thereof at the site have been exhausted and upon



approval by the Employer's Agent. It is stressed that where a shortfall of such material occurs but there is a supply of such material available from excavations, yet to be excavated, the Contractor will be required to obtain the material from such excavations i.e. importation from borrow pits under these circumstances will not be permitted.

PSD 5 CONSTRUCTION

PSD 5.1.1 Safety

PSD 5.1.1.2 Safeguarding of Excavations

Add the following Sub-Clause:

The Contractor shall be responsible for the design and construction of measures to ensure stability of the excavation walls. Such designs shall be done by suitably qualified specialists and before the measures are implemented the designs shall be submitted to the Employer's Agent for his information.

PSD 5.1.1.3 Explosives

A clear motivation must be submitted to the Employer's Agent for approval if a need for blasting arises.

PSD 5.1.3 Stormwater and Groundwater

Add the following to this Sub-Clause:

Over and above his general obligations in regard to dealing with water as specified in SANS 1200 A, the Contractor shall be responsible for preventing the ingress of water into the foundation excavations. The preventive measures shall include the construction of proper drainage channels, diversion channels, berms, sumps, and the supply, operation and maintenance of the necessary bailing and pumping equipment.



The dewatering measures, with the exception of pumping, shall be maintained until the backfilling has been completed, after which all settled silt, mud, etc. shall be removed from the exposed surfaces where necessary. Between the various construction stages, pumping may be interrupted as may be decided by the Employer's Agent. The draining or pumping of water from foundation excavations shall be so done that no concrete materials will be carried away.

PSD 5.2.2 Excavation

Add the following Sub-Clauses:

PSD 5.2.2.4 Utilization of excavated material

Excavated material and material recovered from temporary work shall, in so far as it is suitable, be utilized for backfill. Material unsuitable for use as backfill or in excess of the quantity required to complete the backfill shall be spoiled or utilized as directed by the Employer's Agent.

PSD 5.2.2.6 Unsuitable material

Boulders, logs or any other unsuitable excavated material shall be taken to spoil.

Where, in the opinion of the Employer's Agent, unsuitable material is encountered at founding level, such material shall be removed and replaced with foundation fill in accordance with the requirements of clause PSD 5.2.3.4 of this section and as directed by the Employer's Agent.

PSD 5.2.5.1 Free haul

Add the following Sub-Clause:

For this Project a free haul distance of 5km shall be utilized.

PSD 7 TESTING



Add the following:

PSD 7.4 The requirements of Clause 7 of SANS 1200 DM and SANS 1200 M shall also apply to this Section.

PSD 8 MEASUREMENT AND PAYMENT

PSD 8.3.2 Bulk Excavation

(1) Excavation by hand

Tender rate shall include provision for visually identifying asbestos containing material and collect by hand without the use of shovels, etc. in rocky areas and place in existing nearby adits

Unit: m³

PSD 8.3.4 Importing of materials

(1) Crushing Plant

- **Provide erect and commission on site**

The tendered rate shall include full compensation for supply, erection and commissioning of a crushing plant on site that will be used for crushing rocks that will be used in the gabion baskets and rip rap.

- **Dismantle, remove for site and clean up**

The tendered rate shall include full compensation for the removal from site and cleanup of the crushing plant.

- **Move crushing plant on site from one position to another and clean up**



The tendered rate shall include full compensation for moving the crushing plant around site including all associated transport costs.

(2) Screening Plant

- **Provide erect and commission on site**

The tendered rate shall include full compensation for supply, erection and commissioning of a screening plant on site that will be used for screening rocks that will be used in the gabion baskets and rip rap.

- **Dismantle, remove for site and clean up**

The tendered rate shall include full compensation for the removal from site and cleanup of the screening plant.

- **Move screening plant on site from one position to another and clean up**

The tendered rate shall include full compensation for moving the screening plant around site including all associated transport costs.



SANS 1200 DK : GABIONS AND PITCHING

PSDK 5 MATERIALS

PSDK 5.3.6 Rock and mortar wall

The rock and mortar wall shall preferably contain rocks sourced from site. A 30 MPa mortar shall be used in the rock wall. The rock and mortar wall shall be constructed as per Detail 1 on Drawing MTK 19/2022-002-STDDET-T-00

PSDK 8 MEASUREMENT AND PAYMENT

PSDK 8.2.7 Rock and mortar wall

The rate shall be inclusive of surface preparation, the supply and installation of rocks from either site or commercial sources and the packing of the wall with 30MPa mortar as per Detail 1 on Drawing MTK 19/2022-002-STDDET-T-00.



SANS 1200 DM : EARTHWORKS (ROADS, SUBGRADE)

PSDM 5.2.2.4 Temporary Stockpiling of Materials

The Contractor shall programme the Works in such a way that double handling of material is minimized. No additional payment will be made for temporary stockpiling or extra handling where materials must be stockpiled temporarily.

PSDM 5.2.4.3 Top soiling

The final thickness of topsoil shall be at least 300 mm.

PSDM 5.2.8.2 Overhaul

A free haul distance of 5km shall be utilised.



SANS 1200LE: STORMWATER DRAINAGE

PSLE 1 SCOPE

PSLE 1.1 Add the following:

This specification covers all the work in connection with the construction of drainage blankets at the locations and to the size, shapes, grades and dimensions as shown on the Drawings or as directed by the Employer's Agent.

PSLE 3 MATERIALS

PSLE 3.5 GEOFABRIC BLANKET

Delete this Sub-Clause and refer to Sub-Clause PSLE 3.7(c).

Add the following Sub-Clauses:

PSLE 3.6 Erosion Control blanket

A biodegradable short-term erosion control blanket manufactured from fabric woven with a minimum weight of 500g/m² into an open mesh from rugged, heavy jute yarn.

PSLE 3.7 Geotextiles

Geotextiles shall be a non-woven, spun or thermic-bonded continuous filament fabric consisting of at least 85% by mass of poly- propylene, polyester or other approved material and manufactured for Civil-Engineering applications by a recognized manufacturer.

PSLE 5 CONSTRUCTION

PSLE 5.10 DRAINAGE BLANKETS



Drainage blankets shall be constructed in accordance with the details shown on the Drawings. Firstly geotextile sheeting shall be laid on top of the layer on which the drainage blanket is constructed. Then permeable material of the type specified shall be spread on the geotextile sheeting to the specified depth. The Contractor shall take care not to damage the geotextiles. The permeable material shall be lightly compacted and finished to the required level. To complete the drainage blanket, geotextile sheeting shall be laid on the layer of permeable material.

The layers on top of the drainage blanket shall be constructed in such a manner that the permeable material or the geotextile sheeting will not be displaced or damaged. Normally material which is to be compacted on top of the drainage blanket shall be watered and mixed before it is placed on the blanket. It shall then only be necessary to level and compact the material on the blanket.

PSLE 8 MEASUREMENT AND PAYMENT

Add the following pay items:

PSLE 8.2.16 Geotextiles

(Specify type, grade, density, etc.)

Unit: Square meter (m²)

The unit of measurement shall be the square meter of geotextiles installed, calculated from the authorized dimensions, including the specified overlaps on the top surface of filter drains but not at the joints.

The tendered rate shall include full compensation for the construction of the geotextiles, as specified.

PSLE 8.2.17 Erosion control blanket

Unit: Square meter (m²)



The unit of measurement shall be the square meter of material installed, calculated from the authorized dimensions, including the specified overlaps on the top surface of filter drains but not at the joints.

The tendered rate shall include full compensation for the supply and installation of the erosion control blanket, as specified.



PORTION 3: PARTICULAR SPECIFICATION

PSU: REMOVAL OF TEMPORARY ACCESS

PSU 1 SCOPE

This section covers the removal of all temporary access that can be used to access the site.

PSU 2 INTERPRETATION

PSU 2.1 SUPPORTING SPECIFICATIONS

The following specifications shall, inter alia, form part of the Contract Document:

- (a) SANS 1200C
- (b) SANS 1200D
- (c) SANS 1200DM
- (d) SANS 1200HA

PSU 5 CONSTRUCTION

The Contractor will be responsible to dismantle, rip and remove all temporary access to site upon completion of the rehabilitation infrastructure.

PSU 8 MEASUREMENT AND PAYMENT

PSU 8.1 Removal of temporary access Unit: Sum

The tendered rate will include all associated costs to dismantle, rip and remove all temporary access to site. The rate is deemed to be full compensation to remove all temporary access to the site.

PSU 8.2 Provision of temporary access to site Unit: Sum

The tendered rate will include all associated costs to provide access to site that will enable construction of the works. The rate is deemed to be full compensation for supply and installation of materials to provide access including labour costs.



SECTION VA: ANCILLARY WORK: LANDSCAPING AND GRASSING

PSVA 1 SCOPE

This section covers the landscaping and/or the establishing of vegetation in such areas as indicated on the Drawings or ordered by the Employer's Agent, in writing, including rehabilitation of borrow pits, stockpile and spoil areas and the contractor's work areas, access roads, office and store areas etc.

PSVA 2 INTERPRETATIONS

PSVA 2.1 SUPPORTING SPECIFICATIONS

The following specifications shall, inter alia, form part of the Contract Document:

- (a) SANS 1200A
- (b) SANS 1200D.

PSVA 3 MATERIALS

PSVA 3.1 GRASS SEED

Only good-quality fresh seed shall be used. The types of seed in the mixture and the pure live-seed content shall be as specified or scheduled. Refer to PSVA 5.7.2.

PSVA 3.2 TREES, SHRUBS AND GROUND COVERS

When trees, shrubs and ground covers are supplied and delivered to the Site by the Employer, the Contractor shall give the Employer's Agent at least six weeks advance notice of his requirements. Upon receipt of the plants, the Contractor shall ensure that the plants are in good condition and free from obvious diseases and shall accept full responsibility to maintain the plants in good condition throughout the Contract. The plants shall be fully maintained and watered



during this period, and any losses of plants due to lack of maintenance or diseases developing during the Contract period shall be replaced at the Contractor's expense.

Plants shall be handled and packed in the approved manner for the particular species or variety, and all necessary precautions shall be taken to ensure that plants will arrive at the point of use in proper condition for successful growth. Trucks used for transporting plants shall be equipped with covers to protect plants from windburn. Containers shall be in a good condition.

Plants supplied by the Contractor shall be healthy, shapely and well-rooted. Roots shall not show any evidence of having been restricted or deformed at any time. Plants shall be well-grown and free from insect pests and diseases.

PSVA 3.3 TOPSOIL

Topsoil shall consist of fertile loamy soil selected from areas showing a good coverage of natural vegetation, preferably grasses. It shall be free from deleterious matter such as large roots, stones, refuse, stiff or heavy clays and noxious weeds, which would adversely affect its suitability for the planting of grass. The consistency of the topsoil shall be 30% and 70% of rock and topsoil respectively.

Topsoil may only be obtained wherever suitable material occurs; either from the Site or commercial sources. The topsoil must contain an indigenous local mix of organics. The Employer's Agent shall indicate his requirements to the Contractor regarding the quantity of topsoil required and the areas at which it shall be selected and when it shall be removed. Unless otherwise specified or as instructed by the Employer's Agent, topsoil shall not be taken from more than 400 mm below the original undisturbed surface. If the Contractor fails to conserve topsoil as instructed, he shall obtain suitable substitute material from other sources at no extra cost to the Employer.



Topsoil shall be stockpiled in separate loose heaps as tipped from the trucks and shall not be stockpiled higher than 2,0 m.

PSVA 3.4 MANURE

Manure shall, unless another type is approved by the Employer's Agent, be pure "kraal" manure, free from soil, weed seed or other objectionable material. It shall not contain any particles that will not pass through a 50 mm screen. Only manure which has been approved by the Employer's Agent shall be delivered to the Site.

PSVA 3.5 COMPOST

Compost shall be well-decayed, friable and free from weed seed, dust and other objectionable materials.

PSVA 4 PLANT

Not applicable to this Section.

PSVA 5 CONSTRUCTION

PSVA 5.1 LANDSCAPING OF AREAS

PSVA 5.1.1 Shaping

Areas that require shaping which involves bulk earthworks, such as contoured areas, shall be excavated, filled, compacted when required, and shaped to the correct contours to within a tolerance of plus or minus 150 mm. Such work shall be considered as earthworks and measurement and payment shall be made under SANS 1200D, except that quantities may be measured by means of a grid of levels taken at 10 m intervals before and after shaping, or by means of levelled cross-sections.



PSVA 5.1.2 Trimming

Trimming shall consist of bringing the existing or previously shaped ground to an even surface with the final levels generally following the original surface. Trimming shall normally be done by grader, or, in more confined or steep areas, by bulldozer. Where machine operations are not practicable because of confined spaces or steep slopes, trimming shall be done using hand tools.

All trimming alongside roads and streets shall be completed before landscaping commences. Such trimming shall be carried out on both sides of the road or street up to the boundaries of the road reserve unless otherwise specified or instructed by the Employer's Agent.

Where applicable, trimmed surfaces shall be left slightly rough to facilitate binding with topsoil or the natural establishing of vegetation.

When subsequent grassing is required or when instructed by the Employer's Agent, areas previously shaped shall be trimmed as described above to within a tolerance of plus or minus 25 mm, with all undulations following a smooth curve. The above tolerance shall apply only to areas where the final contours are given in the Drawings.

During trimming, all stones in excess of 50 mm in size and all excess material shall be removed. The trimming of any areas requiring grass shall be done in such a way that, after cultivation and application of any topsoil, the finished surface of the area shall be approximately 25 mm below the top of adjacent kerbing, channeling or pavement.

PSVA 5.1.3 Plant rates

The Employer's Agent shall be entitled to pay for shaping and trimming as described above on the basis of the hourly rates for motor graders and bulldozers. The motor grader and bulldozer to be provided shall each have a fly-wheel power of not less than 93 kW. Any labour or other plant ordered shall



be paid for as "extra work" as specified in clause 40 of the General Conditions of Contract.

PSVA 5.2 PREPARATION OF AREAS FOR GRASSING

The various areas to be grassed shall be prepared as follows:

PSVA 5.2.1 Areas not requiring topsoil

Where the areas to be grassed consist of organically suitable material, they shall be scarified to a minimum depth of 150 mm. All loose stones larger than 30 mm on areas to be mowed by machine shall be removed.

PSVA 5.2.2 Areas requiring topsoil

Where areas to be grassed consist of organically unsuitable material, the surface shall be roughened to ensure a proper bonding between the topsoil and the subsoil. If required, the area shall be scarified as described in Sub-Clause PSVA 5.2.1 above.

Topsoil shall be placed on the prepared surfaces and trimmed to the uniform thickness required. The topsoil shall be prepared by means of hand-rakes or light rotavators to obtain a smooth surface. All stones shall be removed as specified for areas not requiring topsoil in Sub-Clause PSVA 5.2.1 above.

PSVA 5.2.3 Fertilizing

The Contractor shall have the top 150 mm of the prepared surfaces tested to determine the amount and type of fertilizer required for establishing proper growing conditions for the grass. The fertilizer shall be evenly applied over all surfaces where grass is to be planted and shall then be thoroughly mixed with the soil, either mechanically or manually, to a depth of 150 mm. Where



hydroseeding is to be performed, the fertilizer may be mixed with the cellulose pulp and water used in hydroseeding.

PSVA 5.3 GRASSING

The method of establishing grass shall depend on the circumstances relating to each case. The method to be used in each case shall be agreed on by the Employer's Agent and the Contractor.

PSVA 5.3.1 Hydroseeding

The types and mixtures of seeds to be used shall be as specified or scheduled if not so specified and shall be agreed on by the Employer's Agent and the Contractor before any seed is ordered for use by the Contractor. The Contractor shall be solely responsible for establishing an acceptable grass cover, and any approval by the Employer's Agent of seed or seed mixtures proposed for use shall not relieve him of this responsibility.

Cellulose pulp shall be added to the hydroseeding mix at a rate of 25 kg of pulp per kilolitre of water used, except where otherwise instructed for flat slopes.

Hydroseeding shall then be carried out with the use of an approved hydroseeding machine at a rate of application of not less than 38 kg of seed mixture per hectare, unless otherwise specified in the Project Specifications.

When the use of an anti-erosion compound is required and the compound is to be applied simultaneously with the hydroseeding, it shall be mixed with the hydroseeding mixture before application. In this case the amount of cellulose pulp shall be decreased by one-third to a half, depending on the amount of compound added.

PSVA 5.4 ESTABLISHING AND MAINTENANCE OF GRASS



PSVA 5.4.1 Watering, weeding, cutting and replanting

All sodded and planted areas shall be adequately watered at frequent and regular intervals in order to ensure proper seed germination and the growth of grass until the grass has established to an acceptable cover and thereafter until the beginning of the maintenance period of the grass. The amount and frequency of watering shall be subject to the Employer's Agent's approval. Where hydroseeding is carried out, the commencement of watering may be postponed until a favourable time of the year, but watering shall in any case commence and continue as soon as the seeds have germinated and growth begins.

The Contractor shall mow the grass on all areas that have been grassed, whenever so instructed by the Employer's Agent, until the end of the contract period.

All grass cuttings shall be collected and disposed of if so directed by the Employer's Agent. Weeds shall be controlled by means of pulling or cutting or by any other approved means. Any bare patches where the grass has not taken, or where it has been damaged or has dried out shall be re-cultivated, planted, sodded or hydroseeded at the Contractor's expense.

PSVA 5.4.2 Acceptable cover

An acceptable grass cover shall mean that not less than 75% of the area planted or hydroseeded shall be covered with grass and that there shall be no bare patches the maximum dimension of which shall not exceed 500 mm. In the case of sodding, acceptable cover shall mean that the full area shall be covered with live grass at the end of any period of not less than three months after sodding.



PSVA 5.5 TREES, SHRUBS AND GROUND COVERS

PSVA 5.5.1 Positions of plants

The positions in which trees, shrubs and ground covers are to be planted shall be as indicated on the Drawings or as determined by the Employer's Agent, and care shall be taken that the taller plants will not obscure traffic signs.

PSVA 5.5.2 Preparation of plant holes

Unless otherwise directed by the Employer's Agent, holes for trees and shrubs shall be placed and prepared as follows:

- (a) All holes shall be square in plan.
- (b) For shrubs the holes shall be at least 500 mm square by 600 mm deep.
- (c) For trees the holes shall be at least 600 mm square by 700 mm deep.
- (d) The planting holes shall be refilled with selected and approved topsoil, thoroughly mixed with manure or compost (one heaped spade full added to every plant hole) and, depending on soil-test reports, the required amount and type of fertilizer.
- (e) The holes shall be thoroughly watered before planting. Where the local soil has poor drainage, 150 mm of broken rock shall be placed at the bottom of the planting hole before filling it with soil.

PSVA 5.5.3 Planting

Before planting, the plants shall be well watered before they are removed from their containers.

Ground-cover plants shall be carefully lifted from their containers and transferred to holes in the prepared soil, which holes shall be just large enough to accommodate the plant and the adhering soil. Care shall be taken to avoid



exposure of the roots during planting. Soil for ground covers shall be prepared as for grassing as specified in clause PSVA 5.2.

Directly after the planting, plants shall be well-watered to establish them firmly in the soil. After the soil has set, additional soil shall, in the case of trees and shrubs, be added where necessary to bring the backfill material to within 150 mm of the ground surface to ensure the retention of sufficient water. All trees shall be tied to a suitable creosote-treated timber stake planted firmly in the ground. The stake shall have a minimum diameter of 35 mm and shall be at least 300 mm longer than the planted tree, with a maximum length of 3 m above the ground. After planting the ground surface around the plants shall be covered with straw or grass or any other type of mulch to minimize evaporation.

PSVA 5.6 GENERAL

PSVA 5.6.1 Time of planting

The planting of grass, trees, shrubs and ground covers shall be carried out as far as is practicable during periods most likely to produce beneficial results. The Contractor shall make every effort to programme his operations to make this possible.

PSVA 5.6.2 Traffic on grassed areas

The Contractor shall not plant grass until all operations that may require construction equipment to be taken over the grassed areas have been completed. No equipment, trucks or water carts shall be allowed on areas that have been grassed and only equipment required for the preparation of areas, the application of fertilizer and the spreading of topsoil will be allowed to operate on areas ready for grassing.

PSVA 5.6.3 Erosion control

During construction, the Contractor shall protect all areas susceptible to erosion by installing all necessary temporary and permanent drainage works as soon as possible and by taking such other measures as may be necessary to prevent



the concentration of surface water and the scouring of slopes, banks and other areas.

Runnels or erosion channels developing during the construction period or during the maintenance period shall be backfilled and consolidated and the affected areas shall be restored to their former proper condition. The Contractor shall not allow large-scale erosion to develop before effecting repairs and all erosion damage shall be repaired as soon as possible and in any case not later than three months before the end of the maintenance period. Topsoil washed away shall be replaced.

PSVA 5.6.4 Proprietary brand materials used for erosion control

Proprietary brands of materials that may be required for erosion protection to enable natural grass to become established shall be to the approval of the Employer's Agent.

PSVA 5.6.5 Responsibility for establishing an acceptable cover

Notwithstanding the fact that the method of grassing and the type of seed or grass used and the rate of seed application may be specified or agreed to by the Employer's Agent, and that the frequency of mowing will be as instructed by him, the Contractor shall be solely responsible for establishing an acceptable grass cover and for the cost of replanting or re-hydroseeding where an acceptable cover has not been obtained. Where, however, in the opinion of the Contractor, it is doubtful from the outset whether an acceptable cover can be established, he may inform the Employer's Agent of his reasons for this, and the Employer's Agent shall, if he agrees, either adopt another grassing method or agree to accept whatever cover can be obtained, provided that all reasonable efforts are made to establish a good cover by the method proposed. Such agreement shall only be valid if given in writing by the Employer's Agent.



PSVA 5.7 Site-specific Rehabilitation Requirements

PSVA 5.7.1 Rehabilitation of Construction activity sites (such as batch plants, offices, workshops, access roads, borrow areas, etc.)

The rehabilitation measures include:

Soil and vegetation must be rehabilitated before the last rainy season.

The following remedial action must be applied to compacted soil according to the construction areas in which they occurred:

- Soils that were compacted by construction vehicles must be ripped to a depth not less than 0,5-m with a D7 or similar type tracked equipment.
- Where soils were not compacted by construction vehicles the subsoil must be ripped to 150mm with a grader of similar equipment.

All soil originally stripped from the areas must be placed and spread uniformly to create a free draining area.

All oil contaminated or otherwise polluted soil and wastes from the vehicle park/site office areas must be removed to licensed landfill sites using a registered waste disposal company and a certificate obtained.

All damaged fences and gates must be repaired before rehabilitation is completed.

All roads impacted by construction must be repaired and reinstated to their original condition.

PSVA 5.7.1.1 Maintaining designated borrow pits

- Remove and separately stockpile topsoil for use during rehabilitation of the borrow area.
- Minimise the flow of any surface water or floodwater into borrow areas. Where necessary protect borrow areas by an earth berm or sandbag system to deflect clean surface runoff away from the excavations.
- Allow for the natural free drainage of borrow areas. All borrow areas must be drained unless otherwise specified.
- Plan the location of dump sites within the borrow area taking into account the progression of borrow activities and the potential for rehabilitation



Implement the following procedure for all activities at the borrow area:

- STEP 1: ESTABLISHING THE BORROW AREA.** The borrow area must be clearly defined by the Client. The extent of the borrow area must be marked using stakes or rock cairns by the contractor. The alignment of the haul road must be similarly defined.
- STEP 2: PREPARATION OF BORROW AREA.** The borrow pit must be cleared of all vegetation. Topsoil must be stripped, and stockpiled and maintained for later rehabilitation of the borrow area. Where the borrow area is being used as a source of cover material for rehabilitation of asbestos waste a minimum of 300mm of topsoil to be stockpiled at the borrow area for rehabilitation of the borrow area. Topsoil stockpiles shall be protected against erosion and weeds. Surface water deflection berms must be constructed up slope of the borrow pit.
- STEP 3: EXCAVATION OF BORROW MATERIAL.** The borrow material must be removed to leave a slope no steeper than 1:2 on the borrow pit perimeter. Where steeper slopes are formed, these will have to be cut back during closure of the borrow area.
- STEP 4: FINISHING OFF OF BORROW AREA.** Surplus material and rock must be returned to the pit to aid the finishing off process. All fill material must be levelled. Sides of the pit must be graded to a maximum of 1:3 (the preferred slope is 1:5). The gradient of side slopes should vary and sharp angles must be avoided, to blend with the natural landscape. The shaping of the pit shall facilitate drainage of water out of the pit wherever possible.
- STEP 5: REHABILITATION – TOPSOIL.** Replace and redistribute stockpiled topsoil together with herbaceous vegetation, overlying grass and other fine organic matter in all disturbed areas. Stockpiled topsoil shall be spread over, shaped and ripped surfaces. The surface water deflection berm must be maintained. Haul roads shall be ripped and scarified. Where appropriate earth banks must be constructed to prevent erosion.
- STEP 6: REHABILITATION – VEGETATION.** Vegetation should be allowed to re-establish naturally. Fence off the borrow area to keep animals out until vegetation has re-established.



PSVA 5.7.2 Reseeding of disturbed areas

The primary purpose for reseeded is to facilitate the re-establishment of natural vegetation and thereby limit soil erosion. Since alien invasive species are prone to establish more quickly in disturbed areas, reseeded must be undertaken in tandem with an alien invasive plant control programme. The measures required for reseeded are given below:

All areas that were affected by construction activities must be reseeded;

All reseeded activities must be undertaken at the end of the dry season (middle to end September) to ensure optimal conditions for germination and rapid vegetation establishment.

Disturbed areas must be ripped to refusal or a minimum of 500mm a mix of 2:3:2 N:P:K fertilizer at 1ton/ha must be used to soil amelioration. Disturbed areas must be harrowed after spreading 100mm topsoil uniformly.

The area must be seeded with a mix of 3 kg/ha *Eragrostis curvula*, 6kg/ha *Cynodon dactylon*, 6 kg/ha *Digitaria eriantha*, 1kg/ha *Panicum maximum* and 6 kg/ha *Chloris gayana*.

The following trees should be planted in equal proportion:

Acacia caffra, *Acacia robusta*, *Celtis Africana*, *Dichrostachys cineria*, *Dombeya rotundifolia*, *Gymnosporia buxifolia* and *Ziziphus mucronata*.

The following shrubs should be planted in equal proportion:

Buddleja salvifolia, *Carissa bispinosa*, *Ehretia rigida*, *Euclea undulata*, *Grewia occidentalis*, *Olea europaea subsp Africana* and *Rhus dentata*.

An agricultural roller must be used to cover seeds.

Rehabilitated areas must be inspected at three monthly intervals during the first and second growing season to determine the efficacy of rehabilitation measures.

Appropriate remedial action must be taken where vegetation establishment has not been successful or erosion is evident.

Weeds, especially Khakibos *Tagetes minuta*, Blackjack *Bidens pilosa* must be controlled with a broadleaf herbicide that is non-toxic to the environment and is used sparingly.



No construction equipment, vehicles or unauthorized personnel will be allowed onto areas that have been re-vegetated; and
Only persons/ equipment required for maintenance thereof will be allowed to operate on such areas.

PSVA 6 TOLERANCES

Not applicable to this Section.

PSVA 7 TESTING

Not applicable to this Section.

PSVA 8 MEASUREMENT AND PAYMENT

PSVA 8.3 PREPARING AREAS FOR GRASSING AND GROUND COVERS

(a) Topsoiling on the Site with:

(i) Topsoil obtained from the Site (state thickness)

Unit: Square metre (m²)

(ii) Topsoil obtained from commercial sources (including all haulage)(state thickness)

Unit: Square metre (m²)

The unit of measurement for **topsoiling** shall be the square metre of topsoil applied to the specified thickness or as directed by the Employer's Agent, measured in situ after the topsoil has been placed. The quantity shall be calculated from the net area of the surface topsoil, before the application of grass sods. Any topsoil placed in excess of the average thickness specified or ordered shall not be measured for payment.

For payment purposes a distinction shall be made between topsoil obtained from designated areas on the Site or borrow areas and topsoil obtained by the Contractor from outside sources found by him when sufficient topsoil is not available from the said designated areas



The tendered rate shall include full compensation for removal and loading the topsoil, transporting it, placing it in stockpile, constructing the topsoil as specified, including any royalties or compensation that may be payable in the case of topsoil under Sub-item PSVA 8 (b) (ii).

PSVA 8.4 GRASSING

(a) Hydroseeding:

(i) Hydroseeding (as specified) **Unit: Square metre (m²)**

The unit of measurement for **hydroseeding** shall be the hectare of grass established by hydroseeding and having an acceptable cover. The unit of measurement for providing seed shall be the kilogram of seed of the specified mixture, excluding the mass of any pulp added thereto.

The tendered rate shall include full compensation for planting grass by hydroseeding the establishing of an acceptable cover, re-hydroseeding bare patches, and the maintenance of the grass, all as specified, but excluding the mowing of the grass.

General

Half the payments under item PSVA 8.4 shall become due when the grassing or hydroseeding has been carried out, and the remainder shall become due when a satisfactory cover has been established.

PSVA 8.7 TREES, SHRUBS AND GROUND COVERS

The tendered rate shall include full compensation for supplying the plants at the point of final use, including substitutes for plants that may become diseased or may die.



(c) Planting and establishing of:

(i) Trees (as specified) **Unit: Number (No)**

(ii) Shrubs (as specified) **Unit: Number (No)**

The unit of measurement shall be the number of each type planted and established.

The tendered rates shall include, in the case of trees full compensation for supplying the plants at the point of final use, including substitutes for plants that may become diseased or may die, excavating the holes to the specified dimensions, for supplying topsoil, wooden stakes, broken rock, manure and compost, and mixing them with any fertilizer required for planting, for refilling each hole with the topsoil mixture and other soil, for watering the plants until the end of the contract period.



SECTION VC: SECURITY

PSVC 1 SCOPE

Two types of security required for this project namely Normal and Special Security. The same service provider must be used for both Normal and Special security. The service provider shall be registered with the Private Security Industry Regulatory Authority (PSIRA) and possess a Declaration of Good Standing.

Special security may only be mobilized in the event of excepted risks as defined in Clause 8.3 of the GCC. Should the Contractor deem that Special Security is required an emergency meeting will be called for by the Contractor with the Employer and the Employer's Agent, where it will be decided if special security needs to be mobilised. If special security is required the Employer or Employer's Agent will furnish the Contractor with a written instruction.

Once the volatile situation on site has ceased, the Contractor, Employer and Employer's Agent will collectively decide if normal security can be restored. The Employer or Employer's Agent will furnish the Contractor with a written instruction confirming that normal security can be restored.

PSVC 2 INTERPRETATIONS

PSVC 2.1 NORMAL SECURITY

Normal Security will include the deployment of at least two Grade C Security Guards on site. All security guards deployed to site must be registered with PSIRA. The Security Guards will be required to guard the premises daily for 24 hours and conduct access control of all visitors onto the site. The Security Guards will also be required to conduct frequent surveillance. The Security Guards must be provided with a baton, handcuffs, torches and radios.

PSVC 2.2 SPECIAL SECURITY



Special Security will include the deployment of tactical armed Grade A and B Security Guards on site. All security guards deployed to site must be registered with PSIRA. The Security Guards will be required on an ad-hoc in the instance of unrest to guard the premises daily for 24 hours and conduct access control. The Security Guards must be trained to diffuse volatile situations especially amongst large crowds. In addition the guards must be provided with batons, handcuffs, torches and radios.

PSVC 8 MEASUREMENT AND PAYMENT

PSVC 8.1 Normal Security

Unit: Month

The tendered rate shall include full compensation for the provision of full time security as defined in PSVC 2.1. The rate shall be all inclusive and provide compensation for the duration of the Contract.

PSVC 2.2 SPECIAL SECURITY

Special Security will include the deployment of tactical armed Grade A and B Security Guards on site. All security guards deployed to site must be registered with PSIRA. The Security Guards will be required on an ad-hoc in the instance of unrest to guard the premises daily for 24 hours and conduct access control. The Security Guards must be trained to diffuse volatile situations especially amongst large crowds. In addition the guards must be provided with batons, handcuffs, torches and radios.



SECTION VD: CONCRETE CANVAS SPECIFICATION

The following information covers the construction of Concrete Canvas (CC) channels, berms and other anti-erosion structures.

CC is part of a class of construction materials called Geosynthetic Cementitious Composite Mats (GCCMs). It is a flexible, concrete impregnated fabric that hardens on hydration to form a thin, durable, waterproof and fire resistant concrete layer.

1 MATERIALS

1.1. Concrete Canvas Rolls

The Concrete Canvas to be used shall be 0.5 mm thick (CC5). The Concrete Canvas shall be installed and hydrated according to the manufactures specification.

1.2. Joining Nails

All wire used for making the joining nails shall be 2.6 mm in diameter and shall comply with the requirements of SABS 675 or equivalent of mild steel wire.

1.3. Anchor Pegs

Galvanised steel J-pegs in lengths of 250mm and 380mm are to be used to secure the CC in place. Pegs may be sourced from any suppliers but must have a sufficiently sharp point to penetrate the CC and a head design that will capture the surface of CC. Spacing should be approx. no. 1 peg every 2m, based on soil conditions and application. Pegs should be applied at joints where possible to secure adjacent layers together. The anchor peg steel shall comply with the requirements of SABS 920 or equivalent.

1.4. Anchor Trench

Anchor trench should be used in addition to pegging. Anchor Trenches should be excavated 300mm deep and 300mm wide to allow sufficient “tuck-in” space is available for the CC edge.

1.5. Cement

Cement shall be ordinary Portland cement, which complies with the requirements of SABS 471 or equivalent.



1.6. Cement Additives

Use of additives such as plasticisers and retarders are encouraged but must meet with Concrete Canvas' approval.

1.7. Sand

Sand for concrete

Sand for concrete, cement slurry and cement mortar shall comply with the requirements of SABS 1083 or equivalent.

1.7.1. Sand for blinding

Where the base of the excavation is not flat and smooth, sand for blinding shall be used to flatten the excavation. Sand for Concrete Canvas shall not contain any deleterious impurities and shall be well graded.

1.8. Stone for concrete

The stone to be used with concrete shall be clean, washed and single sized road stone, generally complying with the requirements of SABS 1083 or equivalent. Stone shall preferably be 9.5 mm or 13 mm.

2 CONCRETE CANVAS

2.1. General

CC consists of a 3-dimensional fibre matrix containing a dry concrete mix. A PVC backing on one surface of the CC ensures the material is completely water proof. CC can be hydrated either by spraying or by being fully immersed in water. Once set, the fibres reinforce the concrete, preventing crack propagation and providing a safe plastic failure mode.

2.2. Rigging and Pegging

Sufficient rigging string and pegging steel rods for all the tying and pegging of the CC shall be supplied during the construction of the CC structure

2.3. Tolerances

The tolerances for the length of the mats shall be $\pm 10\%$, for the width of the mat $\pm 5\%$ and for the depth of the mat $\pm 5\%$.



3 CONSTRUCTION WITH CONCRETE CANVAS

3.1. Preparing the Foundation and Surface

The surface on which the CC is to be laid prior to hydration, shall be levelled to the depth shown on the drawings, or as instructed by the Engineer, so as to present an even surface. A foundation trench along the crest of the excavation shall be excavated to the dimensions shown on the drawings, or as instructed by the Engineer.

3.2. Assembly

The methods of constructing, stretching, placing in position and hydrating the CC shall generally be in accordance with the manufacturer's instructions which have been approved by the Engineer.

The following is emphasised:

- It is essential that the Contractor ensures that the CC layers are rigged extremely taut. Pegging are required to prevent collapse of the channel structure during construction or hydration, to prevent the CC from floating on the water and to ensure proper contact of the CC with the base.
- CC shall be joined to each other as per manufacturer's instructions. It is not permitted to simply butt one rolls edge against another else a weak construction joint will be formed.
- CC which do not butt to adjacent rolls will terminate in "tuck-in" terminating trenches to the dimensions shown on the drawings or indicated by the Engineer. The CC shall be placed into the terminating beam to a minimum penetrating depth of 150 mm.
- The layout and the tolerance for the installation of the geo-cell mats shall be as shown on the Drawings/Specifications or as indicated by the Engineer

PSVD 8.2 MEASUREMENT AND PAYMENT

PSVD 8.2 Concrete Canvas type CC5 concrete impregnated fibre Unit: m

The tendered rate shall include full compensation for the provision of Concrete Canvas, type CC5 as defined in Section VD above.



4. REFERENCE:

To request a complete copy of the specifications or for further information please contact:

Kaytech:
Tel: +27 31 717 2300
Email: kaytech@kaymac.co.za
Website: www.kaytech.co.za



PSVD 9 DUST AND ASBESTOS FIBRE DISPERSION CONTROL SPECIFICATION:

1. Procedures

- 1.1. Avoid excessive clearing of vegetation.
- 1.2. Control dust and fibre dispersion by:
 - 1.2.1. Maintaining 2 - 4% moisture content by mass in **asbestos containing road surfaces, asbestos containing deposits, recently disturbed areas and active work areas** using a mixture of water and surfactant with a 50:50 mixture of polyoxyethylene ester and polyoxyethylene ether in a 0.16% solution of water; and
 - 1.2.2. Maintaining 2 - 4% moisture content by mass in the top 50mm of **non-asbestos containing road surfaces and active work areas** using water.

2. Measurement for payment

- 2.1 Submit to the Engineer on a monthly basis:
 - 2.1.1 Daily flow meter readings of overall water use on site. Flow meter can be analog or digital. Estimated volumes will not be accepted;
 - 2.1.2 Any delivery receipts for surfactant;
 - 2.1.3 Daily odometer readings for any water carts being used on the site for dust suppression.
 - 2.1.4 Daily soil moisture readings from a mobile soil moisture sensor with 2% soil moisture accuracy taken at one point in each waste deposit or dump and in the asbestos affected portion of the drainage line from the day that the contractor occupies the site until Practical completion:
 - 2.1.5 Weekly soil moisture readings from a mobile soil moisture sensor with 2% soil moisture accuracy taken at one point on any unpaved roads used during construction from the day that the contractor occupies the site until Practical completion:

3. Modifications and conflicts

- 3.1. This specification overrides any other specification;
- 3.2. This specification can be modified by the Engineer;
- 3.3. The Engineer shall consult with the Health and Safety agent in writing on any change to this specification;

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- 3.4. If the Contractor cannot adhere to any part of this specification, the Engineer shall be informed in writing;
- 3.5. The Engineer shall approve any proposed alternative in writing to the Contractor copying the Health and Safety agent in that communication.



PSVD 10 FENCING SPECIFICATION:

The following specifications on the required fencing are extracted from “*Farm Fences*” by J.F. la G Mathee and revised by W.G.S. Grobler. This ARC Agricultural Research Document was published by the Institute for Agricultural Engineering in 2005 with ISBN no.: 1-919849-81-5.

The complete document is available for purchase from the ARC Institute for Agricultural Engineering.

STOCK PROOF FENCING:

1. HEIGHT

The height of a fence is measured from the ground to the highest wire strand. The fence should be at least 1200mm high.

2. WIRING

1.1. Number of strands:

At least nine (9) barbed or plain wires or mixed barbed and plain wires are required to ensure that boundary fences are effective and to prevent access to goats.

1.2. Spacing of wires:

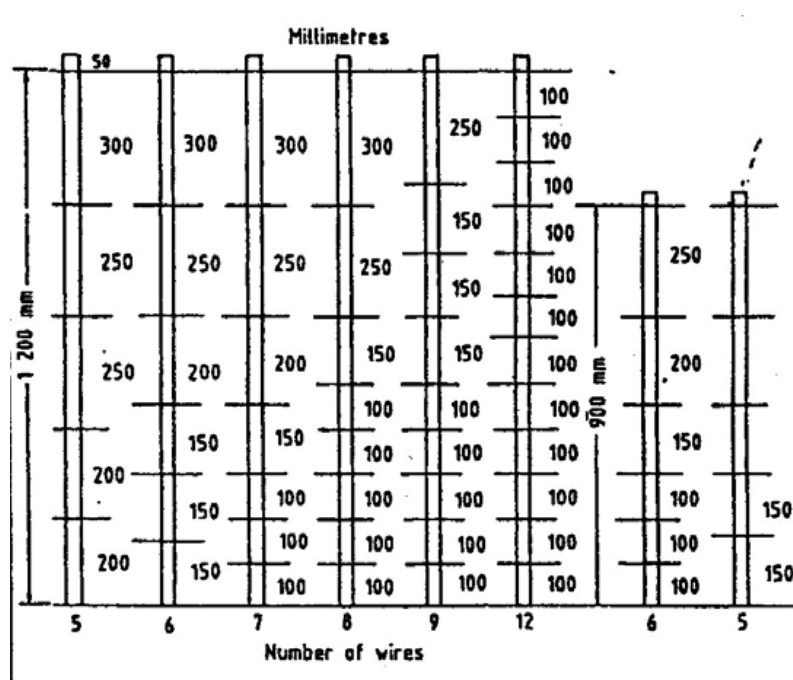


Figure 2.2.1: Spacing of wires



An accepted standard for the spacing of nine wire strands from the top of the standard, and thereafter between successive strands, in millimetres, is as indicated Fig. 2.2.1. The spacing from ground level to the first strand is 100mm.

1.3. Types of wire:

- Barbed wire for stock purposes has barbs at intervals of 125mm or 150mm. For security purposes wire with barbs spaced as close apart as 30mm or less is used. Some of the latter types have barbs punched out of flat steel.
- Wire should be either lightly or fully galvanized as a measure of protection.
- High tensile wire is able to withstand a higher tension than mild steel wire of the same thickness and is more resistant sun damage.

Table 2.3.1 below, describes fencing wire generally used.

Table 2.3.1: Fencing wire generally used

Type and diameter in mm	Lightly galvanized Red label		Fully galvanized Yellow label	
	Mass/roll (kg)	Length/roll (m)	Mass/roll (kg)	Length/roll (m)
A. LINE WIRE				
Single barbed wire				
Oval: 2,80 x 1,90	35	845	35	845
Oval: 3,15 x 2,50	35	515	35	515
Oval: 2,20 x 1,60	28	845	28	845
	17	515	17	515
Doubled barbed wire				
Round: 2 x 2,50	50	540	50	540
	35	380	25	270
	25	270	-	-
Round: 2 x 2,00	35	540	35	540
	17,5	270	17,5	270
Round: 2 x 1,60: High strain	-	-	35	845
	-	-	25	400
Plain high strain				
Round: 2,24	50	1 650	50	1 650
Oval: 2,00 x 2,60	50	1 500	50	1 500
Round: 2,00	50	2 100	50	2 100
5,00	5	30	-	-
	20	130	-	-

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	50	325	-	-
4,00	5	50	5	50
	20	200	20	200
	50	500	50	500
3,55	5	65	5	65
	-	-	20	256
3,15	50	810	50	810
	5	80	5	80
	20	324	20	324
2,80	50	810	50	810
	5	104	5	104
	-	-	20	416
	50	1 040	50	1 040
Aluminium alloy				
Strain wire				
3,10	10	526	20	1 052
4,04	10	294	20	588
4,50	10	238	20	476

B. BINDING WIRE				
Yellow label type and diameter in mm	Mass/roll (kg)	Length/roll (m)	Mass/ roll (kg)	Length/ roll (m)
Plain mild steel	50	3 175	50	3 175
1,60	20	1 270	20	1 270
	5	315	5	315
1,80	50	2 500	50	2 500
	5	250	5	250
2,00	50	2 015	50	2 015
	20	806	20	806
	5	200	5	200
2,50	50	1 300	50	1 300
	20	520	20	520
	5	130	5	130
Aluminium alloy				
2,30	20			1 814
	10			907
2,80	20			1 428
	10			714
3,10	20			1 052
	10			526
C. ANCHOR WIRE				
Galvanized mild steel wire with a minimum diameter of 3.15 mm or aluminium alloy wire with a minimum diameter of 3.10 mm – particulars as above.				



D. WIRE NETTING (Width of roll mm)	Mesh size × Wire diameter			
	90 mm × 1,80 mm		75 mm × 1,80 mm	
	Mass (kg)	Length (m)	Mass (kg)	Length (m)
300	11,4	50	12,7	50
	5,7	25	6,4	25
600	18,7	50	20,8	50
	9,4	25	10,4	25
900	26,5	50	27,2	50
	13,3	25	13,6	25
1 200	32,5	50	36,2	50
	16,3	25	18,1	25
1 500	40,6	50	45,1	50
	20,3	25	22,6	25
1 800	46,4	50	51,5	50
	23,2	25	25,8	25

NOTE: Lightly galvanized wire (red label) is suitable for inland areas. Fully galvanized wire (yellow label) or aluminium alloy is recommended for coastal areas and where fog conditions prevail. **Aluminium alloy wire should under no circumstances be used together with copper chrome arsenate (CCA) impregnated wooden posts.** See Table 8.6 for breaking strength, elastic limit and recommended working tension.

2. STANDARDS

2.1. Spacing:

Spacing suggested for average stock conditions is standards spaced 16m apart with 3 or 4 droppers in between.

2.2. Length of standards:

Standards must have the following minimum lengths and must be set at the following depths:



Height of fence (mm)	Minimum depth planted (mm)	Length of Treated Poles Standards (mm)	Length of Iron standards (mm)
1 050	450	1 500	1 550
1 200	600	1 800	1 850
1 350 / 1 400	650	2 100	2 150
1 800	750	2 700	2 750
2 400	750	3 300	3 050

2.3. Types of Standards:

Standards should be capable of withstanding a bending moment of at least 700Nm in both main axial planes. The following standards meet this requirement:

- Iron standards:

Because of the ease with which they are driven into the ground, iron standards are mainly used for fences. For a 1200mm high fence, the length of these standards is 1850mm, which allows them to be driven into the ground to a maximum depth of 600mm.

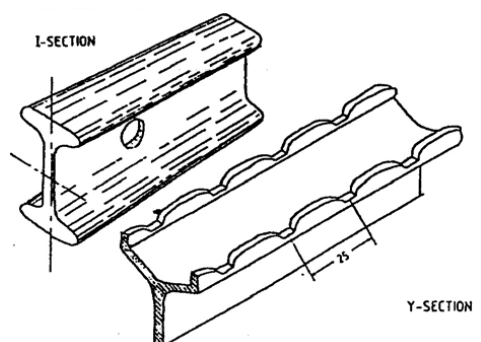


Figure 3.3.1: Iron Standards

The I-section iron standard has a mass of 3.0 kg/m, that is a total mass of 5.5kg for a length of 1850mm, and is obtainable with hole-spacings according to various standard patterns of which the six hole and 13 hole are most commonly used. The 1400mm long standard of this type is provided with seven holes. Where the holes do not correspond to the spacing required between wires, additional holes can be punched through reasonably easily.



The Y-section iron standard has a mass of 2.5 kg/m, that is a total mass of 4.6 kg for an 1850mm length. The standard is provided with notches and holes spaced 50mm apart. This makes it possible to maintain relatively normal wire spacings.

- Iron pipes

Iron pipes with an outside diameter of 50mm and a wall thickness of at least 2.34 mm can be used as standards. The open ends of the pipes must be closed off with metal caps to keep out water.

- Concrete posts

Reinforced concrete posts with a cross-section of 100 mm × 100 mm, or pre-stressed concrete with a cross-section of 75 mm × 75 mm can also be used as standards; provided they meet the requirements regarding bending moments.

3. DROPPERS:

Droppers provide the means for maintaining the spacing of wires between the standards and must be used to ensure the fence is stock proof. The length of the dropper should be more or less equal to the height of the fence. The following may be used:

3.1. Metal Droppers:

The main type of metal dropper used nowadays is commonly known as the Ridgeback, as illustrated in Fig. 4.7. The ridges make it possible to secure each wire to the dropper at the same spacing as on the standards, so that they cannot shift up or down.

3.2. Wire Droppers:

Two strands of 4.00 mm or 3.15 mm thick, plain galvanized wire may be twisted into a cable and used as a dropper. Providing it is possible to maintain the wire spacing on these wire droppers, they can be used at the normal spacings.

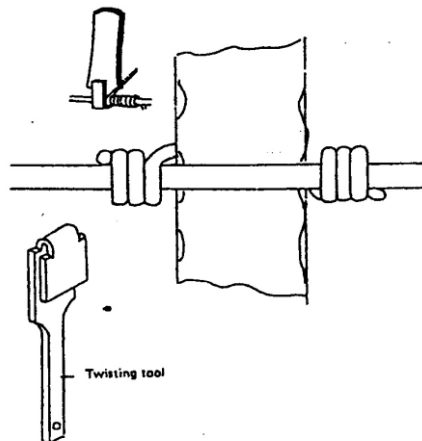
Single-wire droppers of 4.00 mm and 3.15 mm thickness may be used if they are spaced not more than 2m apart.

Since the wire droppers bend easily, the fence soon appears battered. Maintenance of such a fence will also be high.

4. SECURING WIRES

Binding wire of 2.0 mm, 1.8 mm and 1.6 mm can be used. The last-mentioned wire should be used for the tying of netting wire.

The most secure way of tying the wire strands to the standards and droppers is illustrated in Fig. 4.8. A twisting tool, as shown, is very useful for affixing the wire securely.



4.1.

Figure 5.1: Twisting tool

5. STRAINING, CORNER AND GATE POSTS

5.1 Spacing

Straining posts for stock-proof fences must never be further apart than 500m on even terrain and must be spaced closer on broken terrain. These posts must be rigid and sturdy and set well into the ground and be well anchored, because the total horizontal tension in a normal farm fence can be as much as 14kN, which in cold weather can rise to as much as 22kN because of contraction of the wires.

5.2 Any of the following posts may be used

- Steel Posts



Posts made of steel rails with a mass of 10 kg/m length are the lightest that should be used. Rails of 15kg and 20kg/m length can also be used, but they will cost considerably more.

- Iron Pipes

Tubular posts are sometimes used. They should not be less than 100 mm in diameter and the thickness of the walls not be less than 3,65 mm. Tubes must be provided with a steel base plate of 300 mm x 300 mm x 3 mm. The plate should have a 10 mm hole in the middle, through which any moisture which may accumulate in the tube can drain away. If the tube is not completely filled with concrete, it must be provided with a metal cap which will prevent any moisture from entering. Any moisture inside the tube will shorten its life-span.

6.1. Length of Posts

The deeper a post is set into the ground, the more resistant it is against overturning and lifting. The optimum length will depend on soil conditions, on how the post is set and embedded and on the type of anchor employed.

Corner, gate and straining posts must have the following lengths and must be set at the following depths (Table 6.1).

Table 6.3.1: Lengths and depths of straining, corner and gate posts

Height of fence (mm)	Minimum depth planted (mm)	Available lengths (mm)	
		Treated poles	Iron standards
900	580	1 500	1 550
1 050	600	1 800	1 700
1 200	750	2 100	2 150
1 350 / 1 400	750	2 400	2 150
1 800	750	2 700	2 600
2 400	750	3 300	3 200

6.2. The tension of Posts:

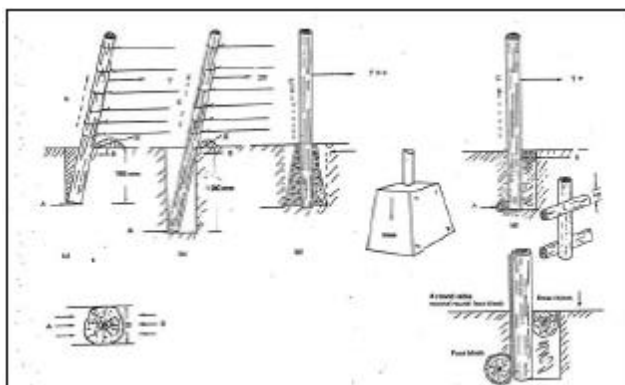




Figure 6.4.1: Tension of posts

As per figure 6.4.1, a post which is set into the ground and subjected to the horizontal pull of the wires tends to be overturned; in the process it apparently rotates round the point X, compressing the soil in doing so (arrow B). On the opposite side, it meanwhile loses contact with the surrounding soil, except right at the bottom where it compresses the soil (arrow A). The whole post also tends to lift out of the ground (arrow C). Arrows A and B represent the resistance which the soil exerts.

Very simply stated, the resistance which the soil exerts against the post is given as “W” and the area of the post which presses against the soil is its diameter (D), multiplied by the depth (h) to which it has been set. If the post remains upright when subjected to the horizontal pull of the wire (T), the forces must balance each other and $T = W \times D \times h$.

The soil resistance (W) will vary from soil to soil, but for a particular soil, the pull (T) can be increased by increasing either the diameter (D) of the post, or the depth (h), or both simultaneously. Tests have shown that a post set to a depth of 1 000 mm can withstand a total pull twice as great as one set 750 mm deep.

In Fig. 6.4.1(c), the post is shown embedded in a concrete block. The total tension (T) now exerted on the post is resisted by a far greater area than $D \times h$, viz. e f g h. Consequently, the post is far more stable. The tendency of the post to lift out of the ground is also effectively counter-acted by the mass of the concrete block.

Note: In this case, the post must pass right through the concrete block to allow moisture, which may start decay of the bottom end of the post, to drain away.

6.3. Setting posts into the soil

The most secure manner in which to set a post into the ground is to embed it in concrete. The hole dug for the post must be at least 400mm × 400mm on the surface and broaden downwards, with the bottom being approximately 500mm × 500mm. A hole of the same diameter as a post and 100mm deep is dug in the centre of the bottom of the hole. The post is placed in the small hole and held upright while a concrete mixture of one pocket (50 kg) cement, 90 litres sand and 140 litres stone (one part cement, 2.75 parts sand and 4.25 parts stone) is poured around it and consolidated well. The concrete must be built up to approximately 100mm above ground level and sloped down, so that rain water can be shed (see Fig. 6.6.1). Only after a minimum of four days may the post be subjected to wire strain.

6.4. Anchors for straining posts

No matter how well a post has been set into the ground; it cannot withstand the total pull of the wires without additional strengthening. It is therefore essential that the post be adequately anchored.

Two types of anchors are generally used:

- Single post anchors:

Providing it is a sturdy post that is anchored as illustrated in Fig. 6.6.2(a), this method of anchoring is very effective and reasonably cheap. Fig.6.6.2 illustrates the main requirements for anchoring a straining post by the method shown.

Once the straining post has been aligned and well set, a hole is dug in line with the fence and at least 2m from the post. This hole should be at least 750 mm deep and wide and long enough to accommodate the anchor piece (D).

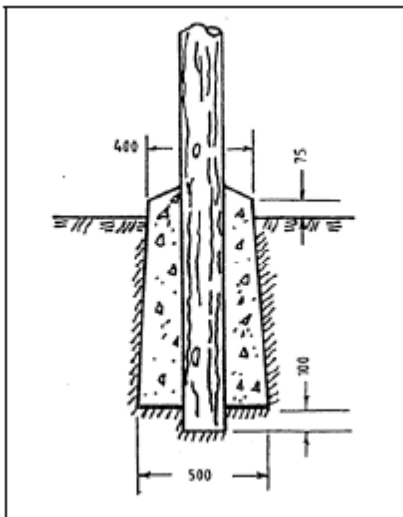


Figure 6.6.1: Anchor post set in concrete

The anchor piece (D), or so-called “dead man”, may be any of the following:

- A stone or concrete block of at least 450 mm x 200 mm x 200 mm and with a mass of approximately 40-50 kg (the larger and heavier the stone or block, the better).
- A treated timber post, 1 200 mm long with a diameter of at least 100 mm.

- A steel plate measuring at least 300 mm × 300 mm × 3 mm which is placed at right angles to the anchor wires.

At least three double strands of 4,00 mm plain galvanised wire are wrapped round the anchor-piece, and fixed to the straining post, about 200 mm from its top, either through a hole or in a notch (E). This will prevent the anchor wires from slipping down the post. The anchor wire strands should all be of approximately the same length and should be reasonably taut before the anchor-piece is covered. This should be done layer by layer with well-compacted soil and stone or gravel. The six anchor wires are then twisted up until they are completely tight, even if the straining post is pulled back slightly in the process. The soil around the post and over the anchor-piece is again rammed down well.

In humid areas and along the coast and in certain brackish soils, the anchor wires buried in the ground will sooner or later rust away and allow the fence wires to slacken. To prevent this, steel rods with a diameter of 10 mm may be wrapped round the anchor-piece to form a loop above ground level. The anchor wires are then connected to this loop. An old iron standard may also be bent round the anchor-piece in such a manner that a portion thereof protrudes above the ground and the anchor wires are then attached to this (Fig. 6.6.2(b)). The greater the distance between the straining post and the anchor-piece, the greater the pull that can be resisted (Fig. 6.6.2(c)).

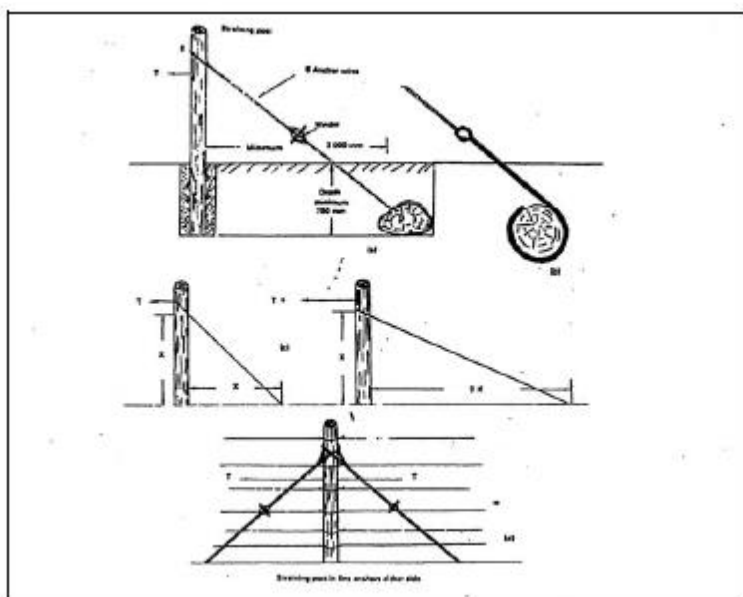


Figure 6.6.2: Single post wire anchors



Fig. 6.6.2 illustrates the main requirements for a straining post strengthened with a diagonal stay. Experience has shown that this particular type of stayed anchor is effective only if both the post and the foot of the stay are embedded in concrete. Always fix the stay to the straining post first and the concrete foot block may then be properly located. For a 1 200 mm high fence, the stay must never be shorter than 1 800 mm and for a 900 mm fence, not shorter than 1 500 mm. The stay may be a timber post of at least 76 mm diameter, or an iron pipe of 40 mm diameter, or an iron standard, preferably one that will not bend easily. This type of stayed straining post should not be used with jackal-proof fences, as the stay provides an ideal ramp, particularly for jackals. In both cases as illustrated in Fig. 6.6.1 and 6.6.2, it is sufficient to anchor or stay the straining post on one side only, since strain on the next portion of the fence makes the anchor or stay practically redundant. An anchor or stay on either side of the straining post does, nevertheless, ensure that each stretch of fence stands securely and taut independently. One never knows how and where a fence may be damaged and only that portion would then have to be repaired and tightened (see Fig. 6.6.1(d) and 6.6.2(b)).

6.5. Box anchors

Circumstances may be such that the single post anchor cannot be used, or that it would be advantageous to use a stronger anchor assembly. In view of the fact that in the case of the box anchor, the tension in the wires is transferred to two or even more posts, this type of anchor assembly is particularly suited for soft soil conditions, such as is found in sandy and moist, wet regions. In the case of corner and gate posts, it is usually essential to use box anchors.

Fig. 6.7.1 illustrates how a box anchor is made and the manner in which the tension in the wires is transferred to the various elements.

The straining post (A) is attached securely to the anchor post (B) by means of the brace (C) and the tie (D). The total pull of the wires (T), tends to overturn the straining post (A) about the point (X). This turning force is transmitted by the brace (C) to the anchor post (B), resulting in the post being pushed deeper into the ground. The pushing force is indicated by the letter (K). Simultaneously, the straining post tends to lift out of the ground (force O). The soil resists the penetration of the anchor post (force GW), while at the same time resisting the lifting force of the straining post (force G). The mass of the post itself (P) also resists this lifting action. Both posts tend to be overturned, while in both cases the soil resists this (force W). In this case, the wire-tie merely holds the brace-assembly securely together.

It is evident that even in this case, the use of transverse foot and breast blocks on both posts will contribute towards increasing the forces of resistance against the pulling tension of the wires (see Fig. 6.4.1(d) and 6.4.1(e)).

There are advantages in making the distance “b” (Fig. 6.7.1) between the straining post and the anchor-post as great as possible. In practice, this brace has a minimum length of 1 800 mm. Because of its rigidity, a single Y-section iron standard may be used. If I-section standards are used, bear in mind that they bend more easily and that two should therefore be bolted together to serve as a brace.

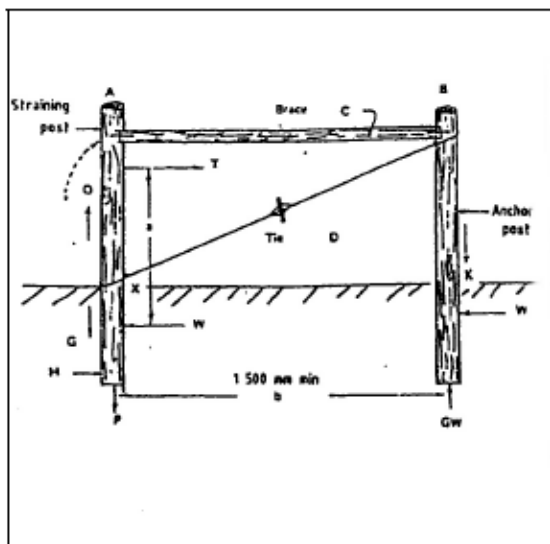


Figure 6.7.1: Principles of a box anchor

6.6. Types of box anchors

There are several ways in which the components of box anchors can be arranged. The basic type, of which the principles are illustrated in Fig. 6.7.1, is the most effective.

Note that the wire tie slopes upwards in the direction of pull of the strands.

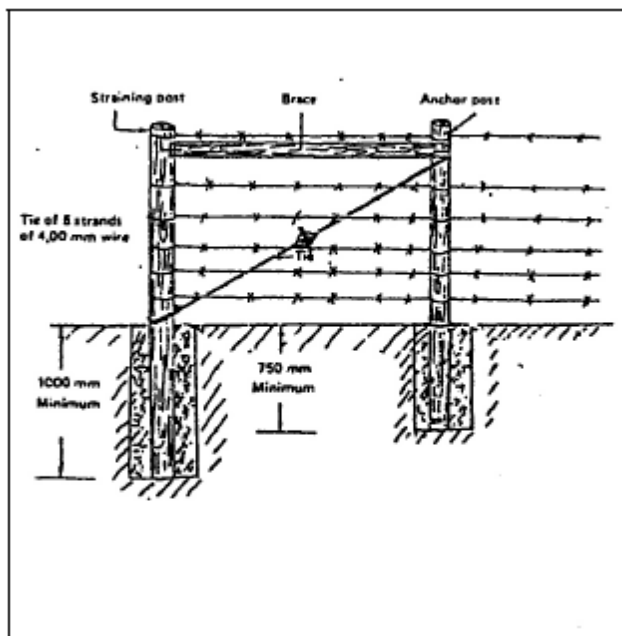


Figure 6.8.1: Simple Box Anchor

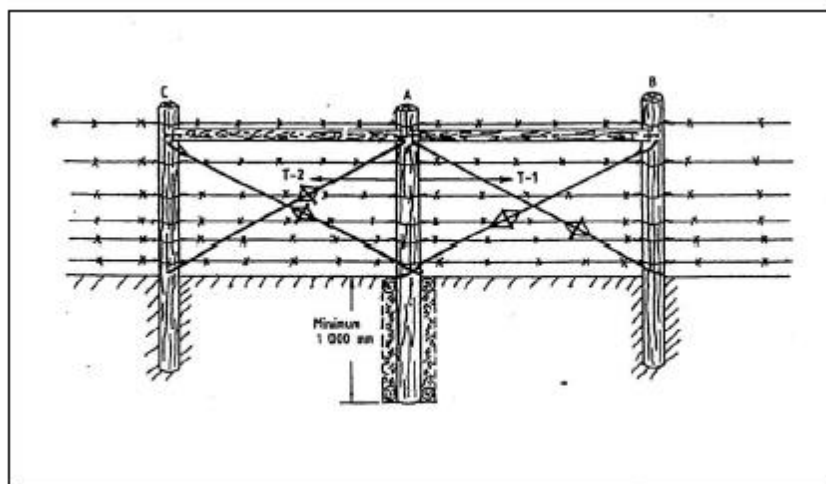


Figure 6.8.2: Straining Post Anchored in both directions

Fig. 6.8.1 shows a box anchor that anchors a straining post in one direction. When a straining post is in the middle of a fence, it is advisable to anchor the straining post in both directions as shown in Fig. 6.8.2.

In this case, there are two crossing wire ties between the straining post and the anchor posts in order to resist unbalanced pulls in both directions. Each wire strand is cut through and fastened separately to the straining post. The wire ties must not be joined to each other where they cross. In cases where high tensional stresses must be resisted, or where there are wet or sandy soils, a double (or even a triple) box anchor may be necessary as shown in Fig. 6.8.3.

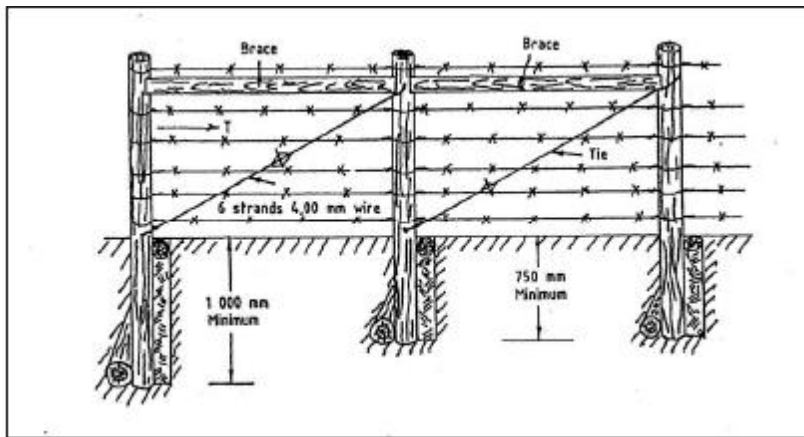


Figure 6.8.3: Double Box Anchor

Double box anchors have more than twice the strength of a single box anchor and only half the horizontal and vertical movement under heavy loads.

There are also other ways in which the members of a box anchor can be arranged. One type that is very sturdy is shown in Fig. 6.8.4.

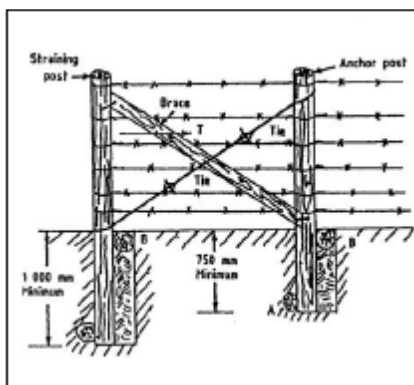


Figure 6.8.4: Box with sloping brace

A few variants of box anchors are shown diagrammatically in Fig. 6.8.5. Horizontal braces must be at least 1 800 mm long and 75 mm in diameter.

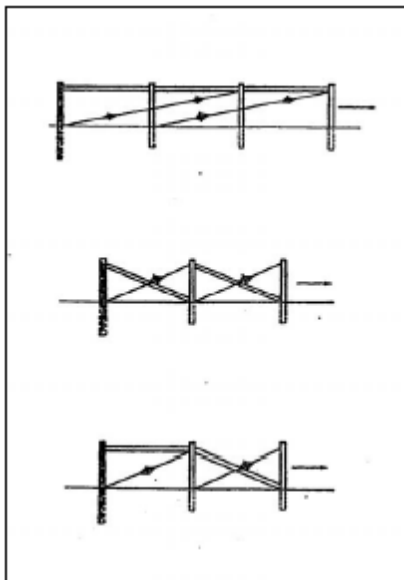


Figure 6.8.5: Box Anchor Variants

6.7. Corner posts

The simplest type of corner post is illustrated in Fig. 6.9.1(a), where anchor-pieces are buried in the soil outside the corner. Anchor wires which project beyond the corner are not acceptable on boundary beacons. They are always troublesome, since they can cause injury to animals, and they are more subject to damage. This is nevertheless the simplest and cheapest kind of corner post. The post must be anchored in the direction of each fence that meets there.

The use of stays such as illustrated in Fig. 6.9.1(b) eliminates the problem of having anchors beyond the corner. It is, however, essential in this case that the corner post and the stays be embedded in concrete, to ensure their stability.

Fig. 6.9.1(c) illustrates a good, proven combination of a corner post with two box anchors, each in the direction of one fence. The other box anchors discussed previously can also be used in like manner on corner posts.

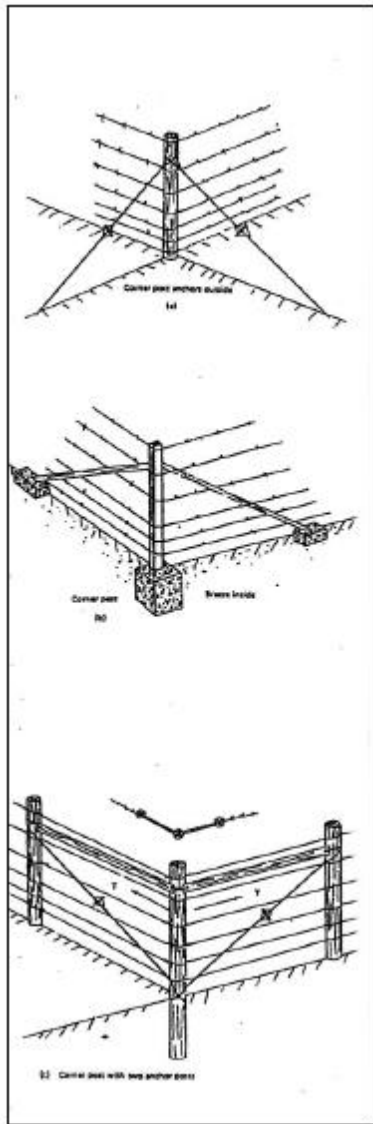


Figure 6.9.1: Types of corner posts

7. GATES

In order to ensure that the gate swings freely and does not drag along the ground, it must support its own mass.

7.1. Vehicle Gates:

- Size: 6000mm wide x 1200mm high
- Type: Double leaf type outward opening



- hung 75 mm off the ground
- 20 mm diameter galvanized pipe set in 300x300x300 mm concrete blocks to receive the gate, with 2 mm thick x 32mm diameter tubular steel complete with locking device, hinge and filled in with barbed and straining wire
- Gate frame to be 42 mm diameter x 2.5 mm thick braced by 32 x 2 mm braces
- The gate post should be embedded in concrete

7.2. Pedestrian Gates:

- Size: 1500mm wide x 1200 mm high
- Type: Single leaf type outward opening
- Hung 75 mm off the ground
- 20 mm diameter galvanized pipe set in 300 mm x 300 mm concrete blocks to receive the gate, drop bolts, with gate consisting of 2mm thick x 32 mm diameter tubular steel complete with locking device, hinge and filled in with barbed and straining wire

8. REFERENCES

La G Mathee, J.F. (1990), Grobler, W.G.S (revised 2005), *Farm Fences*. Revised Edition. Pretoria, Agricultural Research Council Institute for Agricultural Engineering.

PORTION 4: DRAWINGS

Table 1 contains a list of drawings that are issued with this tender and shall become part of the Contract.

Table 1: List of drawings

Drawing No.	Revision	Title
MTK 19/2022-001- MLYT-T- 00	00	General Arrangement

**REHABILITATION OF MARETLWANE NORTH ASBESTOS MINE: RE-ADVERTISEMENT
(MTK 19/2022)**



Volume 2

Part 3: Scope of Work

MTK 19/2022-002- STDDDET-T- 00	00	Typical details – Sheet 1
MTK 19/2022-003- STDDDET-T- 00	00	Typical details – Sheet 2
MTK 19/2022-004- STDDDET-T- 00	00	Typical details – Sheet 3
MTK 19/2022-005- SB-T- 00	00	Nameboard