THEMBISILE HANI LOCAL MUNICIPALITY

UPGRADING OF MAHLABATHINI WATER INFRASTRUCTURE.

SCOPE OF WORK

2.1 EXTENT OF THE WORKS

A brief detail of the works for which this specification is applicable is as follows:

WORK PACKAGE 1 (2025/2026 FINANCIAL YEAR)

- Establishment of camps on site;
- Site clearance and earthworks;
- Accommodation of traffic;
- Protection of existing services;
- Construction of 250mm diameter uPVC pipes, class 12 – 3000m;
- Installations of 250 x 11.5° bends – 1No;
- Installations of 250 x 22.5° bends – 1No;
- Installations of 250 x 90.0° bends – 2No;
- Installations of 250mm equal tees – 3No;
- Construction of anchor blocks;
- Installations of reducers;
- Testing of the water system;
- Manage all quality controls as required by the Engineers; and
- Manage all site staff, CLO and local labourers, plant, equipment and materials.

WORK PACKAGE 2 (2026/2027 FINANCIAL YEAR)

- Establishment of camps on site;
- Site clearance and earthworks;
- Accommodation of traffic;
- Protection of existing services;
- Construction of 200mm diameter uPVC pipes, class 12 – 8160,92m;
- Installations of 200 x 11.5° bends – 69No;
- Installations of 200 x 22.5° bends – 31No;
- Installations of 200 x 45.0° bends – 13No;
- Installations of 200 x 90.0° bends – 13No;
- Installations of 200mm equal tees – 31No;
- Testing of the water system;

- Manage all quality controls as required by the Engineers; and
- Manage all site staff, CLO and local labourers, plant, equipment and materials

WORK PACKAGE 3 (2027/2028 FINANCIAL YEAR)

- Establishment of camps on site;
- Site clearance and earthworks;
- Accommodation of traffic;
- Protection of existing services;
- Construction of 75mm diameter uPVC pipes, class 12 – 9,712m;
- Installations of 75mm fire hydrants – 5No;
- Installations of 75 x 11.5° bends – 142No;
- Installations of 75 x 22.5° bends – 69No;
- Installations of 75 x 45.0° bends – 36No;
- Installations of 75 x 90.0° bends – 38No;
- Installations of 75mm equal tees – 48No;;
- Installation of 414 domestic water meters;
- Excavations and backfilling of trenches;
- Construction of anchor blocks;
- Installations of reducers;
- Testing of the water system;
- Manage all quality controls as required by the Engineers; and
- Manage all site staff, CLO and local labourers, plant, equipment and materials.

2.2 LOCATION OF THE WORKS

The project is located in Mahlabathini Township, Ward 22, under Thembisile Hani Local Municipality (THLM) within the Nkangala District Municipality, Mpumalanga Province.

Mahlabathini lies approximately 90 km northeast of Pretoria, positioned adjacent to the Moloto Road (R573) and R568. The township is situated at a geographical elevation ranging between 1228 m and 1247 m above sea level, with central coordinates at 25°22'41.25"S latitude and 28°41'57.06"E longitude. The municipal wards associated with the township are provided in the accompanying table.

Location of Area

No	Village name	Ward	Latitude (S)	Longitude (E)
1	Mahlabathini	22	25°22'41.25"S	28°41'57.06"E

Locality Details

- Province : Mpumalanga Province
- District : Nkangala District Municipality
- Municipality : Thembisile Hani Local Municipality

2.3 CONSTRUCTION PROGRAM

Construction work under this contract should start not later than two weeks after site handover and should be completed not later than 18 months after site handover.

It is required that the tenderer to submit a detailed construction program linked to the duration of the project and clearly indicating the key deliverables time frames coupled there to and sequence of events.

2.4 TEMPORARY WORKS

The Contractor shall provide, erect, maintain and remove on completion of the Contract, ample temporary offices and sheds for the proper storage of perishable materials and for the use of his workmen.

2.5 SERVICE LEVEL AGREEMENT

A service level agreement will be entered into with the successful bidder. Upon the receipt of the appointment letter the SLA will have to be signed by a successful bidder with 30 days of receipt of the appointment letter.

3.1 ENGINEERING

C 3.1.1 Drawings

The following drawings are applicable to the contract:

DRAWING No.	DESCRIPTION
602231-G-LAY-01	Water Reticulation Layout
G-LAY-01	Water Reticulation proposed 250mm Pipeline
LS-01	250mm Water Reticulation Supply Pipeline Longsection Sheet 1 of 3
LS-02	250mm Water Reticulation Supply Pipeline Longsection Sheet 2 of 3
LS-03	250mm Water Reticulation Supply Pipeline Longsection Sheet 3 of 3
LS-01	Bulk Water Meter Chamber Layout and Detail
LS-01	Bulk Scour Valve Chamber Layout

C 3.2 PROCUREMENT

C 3.2.1 preferential procurement procedures

The works shall be executed in accordance with the conditions specified in the procurement preferencing schedule.

C 3.2.2 Scope of mandatory subcontract work

It is up to the contractor to determine which works should be subcontracted, however any work that is to be sub-contracted must be approved by the Employer.

Competitive tenders shall be invited in respect of each of the portions of the works in accordance with the relevant provisions of the latest edition of the CIDB Standard for Uniformity in Construction Procurement. The Contract Data in the associated procurement documents shall be based on the use of CIDB Standard

subcontract (labour only), SAFCEC General conditions of subcontract (2003 edition) (select appropriate option), with minimal project specific variations and amendments that do not change their intended usage.

The Employer shall evaluate the tenders received in accordance with the provisions of the Standard Conditions of Tender contained in Annexure F of Standard for Uniformity in Construction Procurement. The evaluation panel shall comprise equal representatives from the Employer and from the Contractor.
The Contractor shall without delay enter into contract with the successful tendering subcontractor based on their accepted tender submission. The Contractor shall remain responsible for providing the subcontracted portion of the works as if the work had not been subcontracted.

C 3.3 CONSTRUCTION

C 3.3.1 Applicable SANS 2001 standards for construction works

The following parts of SANS 2001 Construction works standards and associated specification data are applicable to the works:

1) SANS 2001

The abovementioned South African National Standards make several references to the Specification Data for data, provisions and variations that make these standards applicable to this contract. The Specification Data shall have precedence in the interpretation of any ambiguity or inconsistency between it and these standards. Each item of Specification Data given below is cross-referenced to the clause in the standard to which it mainly applies.

The associated Specification Data is as follows:
SANS 2001

Essential Data:
Clause Specification data

Variations:
None

Additional clauses:
None

C 3.3.2 EPWP labour intensive specification

The Guidelines for Implementation of Labour Intensive Infrastructure Projects under The Expanded Public Works Programme (EPWP) are applicable in this contract.

C 3.2.3 Plant and materials provided by the employer

None.

C 3.2.4 Services and facilities provided by the employer

None.

C 3.2.5 Plant and equipment

The plant and equipment used on the site shall not be inferior to that described in the Schedule of Plant and Equipment.

C 3.3 MANAGEMENT

C 3.3.1 Applicable SANS 1921 standards

The following parts of SANS 1921 Construction works standards and associated specification data are applicable to the works:

1) SANS 1921

The abovementioned South African National Standards make several references to the Specification Data for data, provisions and variations that make these standards applicable to this contract. The Specification Data shall have precedence in the interpretation of any ambiguity or inconsistency between it and these standards. Each item of Specification Data given below is cross-referenced to the clause in the standard to which it mainly applies.

The associated Specification Data is as follows:

SANS 1921-1, Construction and management requirements for works contracts – Part 1: General engineering and construction works

Clause Specification data

Essential data
4.1.7 There are no requirements for drawings, information and calculations for which the contractor is responsible
4.2.1 The responsibility strategy assigned to the contractor for the works is A.
4.2.2 The Consulting Engineer is Dikgato Engineering Consultants.
4.3.1 The planning, programme and method statements are to comply with the following:
1) bar chart
4.3.3 The notice period for inspection is one Day.
4.7.3 The overbreak allowances for blasting are provided for in the scope of work.
4.9.3 The trees and shrubs which are not to be disturbed will be pointed out on site by the Engineer.

4.12.2 The samples of materials, workmanship and finishes that the contractor is to provide and deliver to the employer are:
1) cleaning of site on completion
4.12.2 The fabrication drawings that the contractor is to provide and deliver to the employer are:
1) None

4.14.3 The office accommodation, equipment, accommodation for site meetings and other facilities for use by the employer and his agents are:

1) Site office which shall be used for site meetings and for the contractor's use. Such an office shall comprise a minimum of 20m2 in area and 3 m high, be ventilated, have good lamination, must be reasonably sound proof, and have a hard floor construction. It shall be furnished with a desk on which drawings can be rolled open and on which there is sufficient writing space and sufficient temporary chairs or benches to accommodate all persons present at site meetings.

4.14.5 The Contractor is required to provide latrine and ablution facilities.

4.14.6 The requirements for the provision and erection of separate sign boards for consultants and subcontractors are:

1) The boards must comply with the official standard type signboard of the Employer and be at least 2750 x 1800 mm high.

2) The boards must be constructed with a firm flat exposed face using suitable material of firm construction, painted and lettered according to the standard drawings available from the Employer on request and mounted on sturdy pipe-standards at a height of 1800 mm above natural ground level.

4.17.1 The requirements for the termination, diversion or maintenance of existing services are: None.

4.17.3 Services which are known to exist on the site are: None.

4.17.4 The requirements for detection apparatus are: None.

4.18 The following standards and specifications shall be in addition to the provisions of 4.18:

1) See the scope of works.

Variations

None

Additional clauses

1 Site meetings and procedures

The Employer's Representative and the Contractor shall hold meetings relating to the progress of the works at regular intervals and at other such times as may be necessary. The Contractor shall attend all site meetings and shall ensure that all persons under his jurisdiction are notified timeously of all site meetings should the Employer's Representative require their attendance at such meetings. The Contractor shall keep on site a set of minutes of all site meetings, daily records of resources (people and equipment employed), a site instruction book, a complete set of contract working drawings and a copy of the procurement document and make these available at all reasonable times to all persons concerned with the contract.

2 Water and electricity

The Employer does not warrant that any water supply or electricity supply that may exist is adequate for the proper execution of the works. The responsibility strategies in terms of the tabulation below that will apply to the contract is:

a) water :

b) electricity :

Service Option

A

Contractor responsibility

Water The Contractor is to provide, and remove and make good upon completion, all the necessary temporary plumbing connections and purchase water from the local authority for the works at his own cost.

Electricity The Contractor is to provide, and remove and make good upon completion all the necessary temporary electrical connections and installations and purchase electricity form the local authority / ESKOM for the works at his own cost.

SANS 1921-5, Construction and management requirements for works contracts – Part 5: Earthworks activities which are to be performed by hand.
Clause Specification Data
Essential Data:
5.1 The depth of trenches which are to be excavated by hand is 1, 5 metres.
Additional clauses:
1 Stone pitching and rubble concrete masonry
All stone required for stone pitching and rubble concrete masonry, whether grouted or dry, shall be collected, loaded, off loaded and placed by hand.
Sand and stone shall be hauled to its point of placement by means of wheelbarrows where the haul distance is not greater than 150m.
Grout shall be mixed and placed by hand.
2 Manufactured Elements
Elements manufactured or designed by the Contractor, such as manhole rings and cover slabs, precast concrete planks and pipes, masonry units and edge beams shall not individually, have a mass of more than 320kg. In addition the items shall be large enough so that four workers can conveniently and simultaneously acquire a proper hand hold on them.
SANS 1921-6, Construction and management requirements for works contracts – Part 6: HIV/AIDS awareness.
4.2.1(a) A qualified service provider is a service provider that is one that is accredited or provisionally accredited training service provider in the HIV/AIDS field. A list of accredited service providers can be obtained from the Construction SETA (CETA) (Tel: 011-265 5900), Health and Welfare SETA (HWSETA) (011-622 6852) or on the Health and Welfare SETA website: www.hwseta.org.za.

4.2.1(a) The HIV/AIDS awareness programme is to be repeated at four month intervals throughout the duration of the contract. (Four times in total, including the initial one at the start of the contract.)

C 3.3.2 Recording of weather

The Contractor shall erect an effective rainfall gauge on the site and record the daily rainfall figures in a book. Such book shall be handed to the employer's representative for his signature no later than 12 days after rain that is considered to justify an extension of time occurs.

C 3.3.3 Unauthorized persons

The Contractor shall keep unauthorized persons from the works at all times and under no circumstances may any person except guards be allowed to sleep on the building site.

C 3.3.4 Management meetings

There will be monthly compulsory site and technical meetings.

C 3.3.5 Forms for contract administration

Quality control forms will be made available to the contractor in hard copy.

C 3.3.6 Electronic payments

The employer will pay electronically and the contractor must provide correct banking details.

C 3.3.7 Daily records

The contractor shall all the times keep daily records of everything on site.

C 3.3.8 Payment certificates

The contractor must prepare payment certificate every month for approval by the engineer.

C 3.3.9 Communication

The engineer's representative on this project will be:
Mr. T Letsoalo
Contact number: 011 318 1698

The contact person for the employer is:

Mr. S. Kalipa
Tel: 013 986 9138

C3.4 STANDARD SPECIFICATIONS

The following SANS specifications are also referred to in this document and the Contractor is advised to obtain them from Standards South Africa (a division of SABS) in Pretoria.

SANS 10396: 2003: Implementing Preferential Construction Procurement Policies using Targeted Procurement Procedures
SANS 1914-1 to 6 (2002) : Targeted Construction Procurement
SANS 1921 – 1 (2004): Construction and Management Requirements for Works Contracts
Part 1: General Engineering and Construction Works and where accommodation of traffic is involved:
SANS 1921-2 (2004): Construction and Management Requirements for Works Contracts; and
Part 2: Accommodation of Traffic on Public Roads Occupied by the Contractor.

C3.5 PROJECT SPECIFICATIONS

STATUS

The Project Specification consists of two parts which form an integral part of the contract and supplements the Standard Specifications.

Part A contains a general description of the works, the site and the requirements to be met.
Part B contains variations, amendments and additions to the Standardized Specifications and, if applicable, the Particular Specifications.
Part C contains Environmental Management Specification.

In the event of any discrepancy between a part or parts of the Standardized or Particular Specifications and the Project Specification, the Project Specification shall take precedence. In the event of a discrepancy between the Specifications, (including the Project Specifications) and the drawings and / or the Bill of Quantities, the discrepancy shall be resolved by the Engineer before the execution of the work under the relevant item.

The standard specifications which form part of this contract have been written to cover all phases of work normally required for road contracts, and they may therefore cover items not applicable to this particular contract.

C3.5.1: PART A: GENERAL

PS-1 PROJECT DESCRIPTION

The Mahlabathini Water Reticulation System entails the construction of water infrastructure to ensure reliable and efficient distribution of potable water throughout the service area, utilizing uPVC Class 12 pipes for durability and longevity. The system comprises approximately 9,712 m of 75mm diameter uPVC piping and 8,160.92 m of 200mm diameter piping, forming the backbone of the reticulation network. The network also comprises of 3000.0m of 250mm diameter feeder pipeline.

PS-3 DETAILS OF THE WORKS

A brief detail of the works for which this specification is applicable is as follows:

3.1 Construction of the followings;

- Establishment of camps on site;
- Site clearance and earthworks;
- Accommodation of traffic;
- Protection of existing services;
- Construction of 75mm diameter uPVC pipes, class 12 – 9,712m;
- Construction of 200mm diameter uPVC pipes, class 12 – 8,160,92m;
- Construction of 250mm diameter uPVC pipes, class 12 – 3,000m;
- Installations of 75mm fire hydrants – 5No;
- Installations of 75 x 11.5° bends – 142No;
- Installations of 75 x 22.5° bends – 69No;
- Installations of 75 x 45.0° bends – 36No;
- Installations of 75 x 90.0° bends – 38No;
- Installations of 200 x 11.5° bends – 69No;
- Installations of 200 x 22.5° bends – 31No;
- Installations of 200 x 45.0° bends – 13No;
- Installations of 200 x 90.0° bends – 13No;
- Installations of 75mm equal tees – 48No;
- Installations of 200mm equal tees – 31No;
- Installations of 75 x 11.5° bends – 142No;
- Installations of 75mm gate valves – 17No;
- Installations of 200mm gate valves – 6No;
- Installation of 414 domestic water meters;
- Excavations and backfilling of trenches;
- Construction of anchor blocks;
- Installations of reducers;
- Testing of the water system;
- Manage all quality controls as required by the Engineers; and
- Manage all site staff, CLO and local labourers, plant, equipment and materials.

3.2 Nature of ground conditions and subsoil conditions

A geotechnical investigation of the site has been carried out. Detailed Geotechnical Investigation report can be provided to the contractor on request to assist them to acquaint himself with the site conditions including geotechnical conditions.

3.3 Climatic conditions

The average annual rainfall is 600mm and during the entire year, the rain falls for 120.5 days.

3.4 Labour recruitment conditions

A Community Liaison Officer (CLO) will be appointed through the Local community structures community. Recruitment of all local labour should be done through the Community Liaison officer (CLO).

It is mandatory that the Contractor shall interact with the community via proactive project liaison and project participation by its leaders and constituted organizations and forums, as well as through the employment of its people, and these activities shall constitute essential facets of the project.

3.5 Construction in confined Areas

It may be necessary for the Contractor to work within confined areas. Except where provided for in the specifications, no additional payment shall be made for work done in restricted areas. In certain places the width of the fill material and pavement layers may decrease to zero and the working space may be confined. The method of construction in these confined areas largely depends on the Contractor's constructional plant.

However, the Contractor shall note that, unless provided for in terms of the scheduled payment items in the SANS and SABS Standard Specifications or these project specifications, measurement and payment shall be in accordance with the specified cross sections and dimensions only, irrespective of the method used for achieving these cross sections and dimensions, and that the tendered rates and amounts shall include full compensation for all special equipment and construction methods and for all difficulties encountered when working in confined areas and narrow widths, and at or around obstructions, and that no extra payment shall be made nor shall any claim for additional payment be considered in such cases.

PS-4 CONSTRUCTION AND MANAGEMENT REQUIREMENTS

4.1 General

The Contractor is referred to SANS 1921: 2004 parts 1, 2 and 3: Construction and Management Requirements for Works Contracts. These specifications shall be applicable to the contract under consideration and the Contractor shall comply with all requirements relevant to the project.

Certain aspects however require further attention as described hereafter.

4.1.1 Drawings (Read with SANS 1921 – 1: 2004 clauses 4.1.7; 4.1.11 and 4.1.12)

The requirements for drawings, information and calculations for which the Contractor is responsible are:

None.

The reduced drawings which form part of the tender documents shall be used for tendering purposes only.

The contractor shall be supplied with three complete paper copies of the construction drawings free of charge.

The Contractor shall at his own expense produce there from all further paper prints required for the construction of the work.

At the completion of the Contract, the Contractor shall return to the Engineer all drawings, provided or made, during the contract period.

Any information which the Contractor has control over and which is required by the Resident Engineer to complete the as built drawings shall be made available to the Resident Engineer before the completion certificate is issued.

Only written dimensions may be used. Dimensions are not to be scaled from drawings unless ordered by the Engineer. The Engineer will supply all figures / dimensions which are not shown on the drawings. The levels or dimensions given on the drawings are subject to confirmation on site. The Contractor shall submit all levels and dimensions to the Engineer for confirmation before he commences with any structural construction work. The Contractor shall also check all clearances which are given on the drawings and inform the Engineer of any conflicting dimensions.

Any destination names on road signs which may be indicated on the drawings are subject to confirmation by the Engineer before these signs are manufactured.

4.2 Responsibilities for design and construction

Structural Engineer

The structural engineer responsible for the design in accordance with the specification is Mahlangu Behr Infrastructure Consultants.

4.3 Planning and Programme (Read with SANS1921-1:2004 clause 4.3)

Preliminary programme

The Contractor shall include with his tender a preliminary programme on the prescribed form to be completed by all Tenderers. The programme shall be in the form of a simplified bar chart with sufficient details to show clearly how the works will be performed within the time for completion as stated in the Contract Data.

Tenderers may submit tenders for an alternative Time for Completion in addition to a tender based on the specified Time for Completion. Each such alternative tender shall include a preliminary programme similar to the programme above for the execution of the works, and shall motivate his proposal clearly by stating all the financial implications of the alternative completion time.

The Contractor shall be deemed to have allowed fully in his tendered rates and prices as well as in his programme for all possible delays due to normal adverse weather conditions and special non-working days as specified in the Special Conditions of Contract, in the

Project Specifications and in the Contract Data.

The following constraints shall be taken into account in preparing the preliminary construction programme which must be submitted with the Tender. These same constraints shall apply to the final construction programme.

a) The Contract time is 18 months. Plant and personnel requirements to complete the project in 18 months must be incorporated in the Tender.

b) A high standard of traffic accommodation.
c) The relocation of services are to be determined during construction.
d) Ancillary works by Emerging Contractors.

Programme in terms of Clause 12 of the General Conditions of Contract

It is essential that the construction programme, which shall conform in all respects to Clause 12 of the General Conditions of Contract, be furnished within the time stated in the Contract Data. The preliminary programme to be submitted with the tender shall be used as basis for this programme. The Contractor's attention is also drawn to clause 40.3 of the General Conditions of Contract 2015.

4.4 Quality Assurance (QA) (Read with SANS 1921 – 1: 2004 clause 4.4)

The Contractor will be solely responsible for the production of work that complies with the Specifications to the satisfaction of the Engineer. To this end it will be the full responsibility of the Contractor to institute an appropriate Quality Assurance (QA) system on site. The Engineer will audit the Contractor's quality assurance (QA) system on a regular basis to verify that adequate independent checks and tests are being carried out and to ensure that the Contractor's own control is sufficient to identify any possible quality problems which could cause a delay or failure.

The Contractor shall ensure that efficient supervisory staff, the required transport, instruments, equipment and tools are available to control the quality of his own workmanship in accordance with his QA-system. His attention is drawn to the fact that it is not the duty of the Engineer or the Engineer’s representative to act as foreman or surveyor.

4.5 Management and disposal of water (Read with SANS 1921 - 1: 2004 clause 4.6)

The Contractor shall pay special attention to the management and disposal of water and stormwater on the site. It is essential that all completed works or parts thereof are kept dry and properly drained. Claims for delay and for repair of damage caused to the works as a result of the Contractor’s failure to properly manage rain and surface water, will not be considered.

4.6 Earthworks (Read with SANS 1921 - 1: 2004 clause 4.10)

Borrow pits and spoil areas

The borrow pits to be used for this contract shall be pointed out at the Site Inspection. The Contractor shall be permitted to use only those borrow pits approved by the Engineer.

The spoil sites shall be determined on site in conjunction with the Engineer, and the local communities. The Contractor shall be permitted to use only those spoil areas approved by the Engineer.

Should the Contractor wish to use any other tip area for the disposal of soil, rubble, vegetation, etc, its use shall be subject to the approval of the Engineer and the landowner.

4.11 Testing(Read with SANS 1921 – 1: 2004 clause 4.11)

Process control

The Contractor shall arrange for all tests required for process control to be done by a laboratory acceptable to and approved by the Engineer.

The Contractor may establish his own laboratory on site or he may employ the services of an independent commercial laboratory. Whatever method is used, the Contractor must submit the results of tests carried out on materials and workmanship when submitting work for acceptance by the Engineer. The costs for these tests shall be deemed to be included in the relevant rates and no additional payment will be made for testing as required.

Acceptance control

The process control test results submitted by the Contractor for approval of materials and workmanship may be used by the Engineer for acceptance control. However, before accepting any work, the Engineer may have further control tests carried out by a laboratory of his choice. The cost of such additional tests will be covered by a provisional sum provided in the schedule of quantities, but tests that failed to confirm compliance with the specifications, will be for the account of the Contractor.

4.14 Site Establishment (Read with SANS 1921 - 1: 2004 clause 4.14)

Contractor's camp site and depot

The Contractor is responsible to provide a suitable site for his camp and to provide accommodation for his personnel and labourers. If the Employer can make any specific site available to the Contractor, such site will be pointed out to the Contractor.

The chosen site shall be subject to the approval of the Engineer, the Local Authorities and the Client. Possible locations for a campsite shall be pointed out at the Site inspection. The Contractor shall conform to all local authority, environmental and industrial regulations.

The Contractor shall make his own arrangements concerning the supply of electrical power and all other services. No direct payment shall be made for the provision of electrical and other services. The cost thereof shall be deemed to be included in the rates and amounts tendered for the various items of work for which these services are required.

The Contractor shall provide security watchmen for the contract as he deems fit at no extra cost for the Employer. The Contractor must ensure that all his employees as well as the employees of his subcontractors are able to identify themselves as members of the construction team.

Accommodation of Employees

No employees except for security guards will be allowed to sleep or be accommodated on the site in urban areas.

No housing is available for the Contractor's employees and the Contractor shall make his own arrangements to house his employees and to transport them to site.

No informal housing or squatting will be allowed.

The Contractor shall provide the necessary ablution facilities at his camp site and the site of the works for the use of his employees. Chemical toilets only will be allowed where temporary facilities have to be provided.

4.15 Survey beacons (Read with SANS 1921 - 1: 2004 clause 4.15)

The Contractor shall take special precautions to protect all permanent survey beacons or pegs such as bench-marks, stand boundary pegs and trigonometrical beacons, regardless whether such beacons or pegs were placed before or during the execution of the Contract. If any such beacons or pegs have been disturbed by the Contractor or his employees, the Contractor shall have them replaced by a registered land surveyor at his own cost.

4.17 Existing Services (Read with SANS 1921 - 1: 2004 clause 4.17)

The Contractor shall make himself acquainted with the position of all existing services before any excavation or other work likely to affect the existing services is commenced.

The Contractor will be held responsible for any damage to known existing services caused by or arising out of his operations and any damage shall be made good at his own expense. Damage to unknown services shall be repaired as soon as possible and liability shall be determined on site when such damage should occur.

A provisional amount is included in the bill of quantities for the protection of services.

Prior to commencing construction activities in a particular area, the Contractor shall also diligently enquire of local landowners as to whether there are any other known services which have not been shown on the drawings but which may be affected by the construction activities in that area, and any such services shall be brought to the attention of the Engineer immediately.

The Contractor shall take note of the requirements of clause 1202 of the standard specifications with regard to services.

4.18 Health and Safety (Read with SANS 1921 - 1: 2004 clause 4.18)

4.18.1 General statement

It is a requirement of this contract that the Contractor shall provide a safe and healthy working environment and to direct all his activities in such a manner that his employees and any other persons, who may be directly affected by his activities, are not exposed to hazards to their health and safety. To this end the Contractor shall assume full responsibility to conform to all the provisions of the Occupational Health and Safety Act No 85 and Amendment Act No 181 of 1993, and the OHSA 1993 Construction Regulations 2003 issued on 18 July 2003 by the Department of Labour.

For the purpose of this contract the Contractor is required to confirm his status as mandatory and employer in his own right for the execution of the contract by entering into

an agreement with the Employer in terms of the Occupational Health and Safety Act in the form as included in section C1.2.4

Health and Safety Specifications and Plans

(a) Employer's Health and Safety Specification

The Employer's Health and Safety Specification will be included in the tender documents as part of the Project Specifications.

(b) Tenderer's Health and Safety Plan

The Tenderer shall submit with his tender his own documented Health and Safety Plan he proposes to implement for the execution of the work under the contract. His Health and Safety Plan must at least cover the following:

(i) A proper risk assessment of the works, risk items, work methods and procedures in terms of Regulations 7 to 28;
(ii) Pro-active identification of potential hazards and unsafe working conditions;
(iii) Provision of a safe working environment and equipment;
(iv) Statements of methods to ensure the health and safety of subcontractors, employees and visitors to the site, including safety training in hazards and risk areas (Regulation 5);
(v) Monitoring health and safety on the site of works on a regular basis, and keeping of records and registers as provided for in the Construction Regulations;
(vi) Details of the Construction Supervisor, the Construction Safety Officers and other competent persons he intends to appoint for the construction works in terms of Regulation 6 and other applicable regulations; and
(vii) Details of methods to ensure that his Health and Safety Plan is carried out effectively in accordance with the Construction Regulations 2003.

The Contractor's Health and Safety Plan will be subject to approval by the Employer, or amendment if necessary, before commencement of construction work. The Contractor will not be allowed to commence work, or his work will be suspended if he had already commenced work, before he has obtained the Employer's written approval of his Health and Safety Plan.

Time lost due to delayed commencement or suspension of the work as a result of the Contractor's failure to obtain approval for his safety plan, shall not be used as a reason to claim for extension of time or standing time and related costs Cost of compliance with the OHSA Construction Regulations

The rates and prices tendered by the Contractor shall be deemed to include all costs for conforming to the requirements of the Act, the Construction Regulations and the Employer's Health and Safety Specification as applicable to this contract.

Should the Contractor fail to comply with the provisions of the Construction Regulations, he will be liable for penalties as provided in the Construction Regulations and in the Employer's Health and Safety Specification.

4.18.2 Requirements for Accommodation of Traffic (Read with SANS 1921 - 2: 2004)

General

The Contractor will be responsible for the safe and easy passage of public traffic past and on sections of roads of which he has occupation or where work has to be done near traffic.
The travelling public shall have the right of way on public roads, and the Contractor shall make use of approved methods to control the movement of his equipment and vehicles so as not to constitute a hazard on the road.

Accommodation of traffic, where applicable shall comply with SANS 1921-2: 2004: Construction and Management Requirements for Works Contracts, Part 2: Accommodation of Traffic on Public Roads occupied by the Contractor. The Contractor shall obtain this specification from Standards South Africa if accommodation of traffic will be involved on any part of the construction works.

Basic Requirements

The travelling public shall have the right of way on public roads, and the Contractor shall make use of approved methods to control the movement of his equipment and vehicles so as not to constitute a hazard on the road.

The Contractor shall ensure that all road signs, barricades, delineators, flagmen and speed controls are effective and that courtesy is extended to the public at all times.

Failure to maintain road signs, warning signs or flicker lights, etc, in a good condition shall constitute ample reason for the Engineer to suspend the work until the road signs, etc, have been repaired to his satisfaction.

The Contractor may not commence constructional activities affecting existing roads before adequate provision has been made to accommodate traffic in accordance with the requirements of this document and the South African Road Traffic Signs Manual.

The Contractor shall construct and maintain all temporary drainage works necessary for temporary deviations.

The Contractor shall provide and grant access to persons whose properties fall within or adjoin the area in which he is working.

Payment

The Contractor’s tendered rates for the relevant items in the Bill of Quantities shall include full compensation for all possible additional costs which may arise from this, and no claims for extra payment due to inconvenience as a result of the modus operandi will be considered.

4.19 Management of the environment (Read with SANS 1921 - 1: 2004 clause 4.19)

Respect for the environment is an important aspect of this contract and the Contractor shall pay special attention to the following:

(a) Natural Vegetation

The Contractor shall confine his operation to the limits of the road reserve for the purpose of constructing the works and where applicable detours, shall be sited in consultation with the Engineer and the local communities.

Only those trees and shrubs directly affected by the works and such others as the Engineer may direct I writing shall be cut down and stumped. The natural vegetation, grassing and other plants shall not be disturbed other than in areas where it is essential for the execution of the work or where directed by the Engineer.

(b) Fires

The Contractor shall comply with the statutory and local fire regulations. He shall also take all necessary precautions to prevent any fires. In the event of fire the Contractor shall take active steps to limit and extinguish the fire and shall accept full responsibility for damages and claims resulting from such fires which may have been caused by him or his employees.

(c) Environmental Management Plan

In addition to the above all requirements according to the Environmental Management Plan as detailed in C3.3, Particular Specifications, will be adhered to.

PART B: AMENDMENTS TO THE STANDARD AND PARTICULAR SPECIFICATIONS

B1 PROJECT SPECIFICATIONS RELATING TO THE STANDARD SPECIFICATIONS AND OTHER ADDITIONAL SPECIFICATIONS

VARIATIONS AND ADDITIONS TO SABS 1200 STANDARDIZED SPECIFICATIONS AND PARTICULAR SPECIFICATIONS

The following variations and additions to the SABS 1200 Standardized Specifications referred to above apply to this Contract. The prefix PS indicates an amendment to SABS 1200. The letters and numbers following these prefixes respectively indicate the relevant Standardized Specification and clause numbers in SABS 1200 to which the variation or addition thereto applies.

PART 1: DESCRIPTION OF THE WORKS

PS1 DESCRIPTION OF WORKS

PS1-1 General

The Mahlabathini Water Reticulation System entails the construction of water infrastructure to ensure reliable and efficient distribution of potable water throughout the service area, utilizing uPVC Class 12 pipes for durability and longevity. The system comprises approximately 9,712 m of 75mm diameter uPVC piping and 8,160.92 m of 200mm diameter piping, forming the backbone of the reticulation network. The network also comprises of 3,000m of 250mm diameter feeder pipeline.

PS1-2 Scope of contract

The work covered by this contract includes:

- Establishment of camps on site;
- Site clearance and earthworks;
- Accommodation of traffic;
- Protection of existing services;
- Construction of 75mm diameter uPVC pipes, class 12 – 9,712m;
- Construction of 200mm diameter uPVC pipes, class 12 – 8,160,92m;
- Construction of 250mm diameter uPVC pipes, class 12 – 3,000m;
- Installations of 75mm fire hydrants – 5No;
- Installations of 75 x 11.5° bends – 142No;
- Installations of 75 x 22.5° bends – 69No;
- Installations of 75 x 45.0° bends – 36No;
- Installations of 75 x 90.0° bends – 38No;
- Installations of 200 x 11.5° bends – 69No;
- Installations of 200 x 22.5° bends – 31No;
- Installations of 200 x 45.0° bends – 13No;
- Installations of 200 x 90.0° bends – 13No;
- Installations of 75mm equal tees – 48No;

- Installations of 200mm equal tees – 31No;
- Installations of 75 x 11.5° bends – 142No;
- Installations of 75mm gate valves – 17No;
- Installations of 200mm gate valves – 6No;
- Installation of 414 domestic water meters;
- Excavations and backfilling of trenches;
- Construction of anchor blocks;
- Installations of reducers;
- Testing of the water system;
- Manage all quality controls as required by the Engineers; and
- Manage all site staff, CLO and local labourers, plant, equipment and materials.

PS2 DESCRIPTION OF SITE AND ACCESS

Mahlabathini Township is located within the Thembisile Hani Local Municipality (THLM) in the Mpumalanga Province of South Africa, Mahlabathini Township is situated about 90km northeast of Pretoria, adjacent to the Moloto Road (R573) and R568. The geographical elevation of the area varies between 1228m and 1247m above sea level. The coordinates for the townships are latitude 25°22'41.25"S and longitude 28°41'57.06"E.

PS3 CHARACTER OF STRATA AND MATERIALS ON SITE

PS3-1 Character of strata

The Contractor will have to excavate soil materials that will vary from sandy soils to deeper lying hard shales and sandstones. The information regarding the sub-surface conditions and materials on the Site is provided in good faith for the Contractor's convenience as an indication of the conditions likely to be encountered. No responsibility will be accepted for, and there is no guarantee of, the information being representative of the whole area of the Works or of the various materials encountered. The provision of such information shall not be regarded as in any way limiting, or detracting from, the Contractor's responsibilities in terms of the General Conditions of Contract and the Specifications. The Contractor will be held to have satisfied himself as to the sub-surface conditions to be encountered and to have allowed accordingly in his tendered rates.

PS3-2 Disclaimer

The information regarding the subsurface conditions and materials on the sites is provided in good faith for the Contractor's convenience as an indication of the conditions likely to be encountered.

The Provision of such information shall not be regarded as in any way limiting, or detracting from, the Contractor's responsibilities in terms of the General Condition of Contract and the Specifications. The Contractor will be held to have satisfied himself as to the subsurface conditions to be encountered and to allow accordingly in his tendered rates.

PS4 PROGRAM

PS4-1 Preliminary Program to be submitted with tender

The Contractor's preliminary program shall be in a bar chart form and shall form part of the documentation to be submitted with the program (refer to Part T2 – Returnable documents – Preliminary Program).

In addition to the requirements of Sub clause 12(3) of the General Conditions of Contract, the Contractor's program shall show:

a) the various activities, related to a time scale, for each element of the works, in sufficient detail to be able to assess construction progress;

b) critical path activities and their dependencies,

c) key dates in respect of work to be carried out by others;

d) key dates in respect of information to be provided by the Engineer and/or others, and

e) his anticipated monthly expenditure.

Within 14 days after the receipt of the letter of acceptance, the contractor shall submit to the Engineer a realistic program for the execution of the work.

PS4-2 General allowance

When drawing up his program, the Contractor shall, take into consideration and make allowance for, inter alia:

a) expected weather conditions and their effects;

b) known physical conditions or artificial obstruction;

c) searching for, dealing with and carrying out alterations to the existing services;

d) the accommodation and safeguarding of public access and traffic;

e) the design, testing and approval of the concrete mixes;

f) the restrictions on the length of trench open at any one time as specified in PSDB5-3.

g) the approval and testing of pipelines;

h) see page of water into the excavations;

PS4-3 Required sequence of construction and interim dates

The work shall be carried out in an approved and logical sequence and in such a manner that each section of the work at the end of a phase can be considered practically complete.

PS4-4 Review of progress

The Contractor shall review his progress each month and should progress lag behind the latest accepted program, by more than 2 weeks, he shall submit a revised program and method statement of how he proposes to make up the lost time. If, in the opinion of the Engineer, such revised program will not make up the lost time, the Engineer shall have the right to request the Contractor to reorganize his work in a manner which will ensure an acceptable program. Claims for additional payment to meet any costs incurred due to such reorganization will not be accepted.

PS4-5 Penalties

The penalty, as stated in the Contract Data Completed by the Employer for the late completion of the Works, will be applied as specified in Clause 43 of the General Conditions of Contract.

PS5 SITE FACILITIES AVAILABLE

PS5-1 Water supply and power

Water is available in Mahlabathini and is subject to the normal regulations. The Contractor shall make his own arrangements with Thembisile Hani Local Municipality, and pay all installation and consumption charges, for the supply of water required.

The Contractor shall be responsible for providing on site, at his own cost, the power required and for making his own arrangements with the appropriate authority for such power. The employer will not consider any claim in respect of the lack of the continuous or efficient supply of power.

PS5-2 Camps and depot

The Contractor is solely responsible for the location and maintenance of a camp site.

The Contractor may erect his offices and storage depot within the boundaries of the area indicated by the Engineer and Thembisile Hani Local Municipality.

The Contractor shall enclose the whole campsite area with an adequate security fence to ensure that unauthorized persons cannot enter. The Contractor shall remove the fencing on completion of the Contract.

No housing is available and the Contractor shall make his own arrangements to house his employees and transport them to and from the Site. All arrangements for housing workmen shall be made in accordance with and subject to applicable regulations and requirements.

PS5-4 Disposal sites and borrow pit

The Contractor shall be responsible for locating suitable disposal sites for the disposal of unsuitable or surplus material and borrow pits for the location of suitable material in consultation with and to the satisfaction of the Thembisile Hani Local Municipality and the Engineer.

The Contractor shall obtain the prior approval of the Engineer for any disposal site or borrow pit he proposes to use.

In accordance with PSA8-12 no haulage of any material to the disposal site or borrow pit will be measured for payment since all such sites will be assumed to be within a 15 km radius of the center of Mahlabathini.

PS6 SITE FACILITIES REQUIRED

PS6-1 Facilities for the Engineer

The Contractor shall provide on Site for the use of the Engineer, maintain and service, as applicable, the following facilities as specified in SABS 1200 AB and PSAB:

a) Two name boards,
b) One airconditioned, furnished office with conference facilities,
c) Latrine and ablution facilities,

d) Carport for two vehicles,
e) Survey equipment
f) Site instruction book,

Unless specified otherwise, on completion of the Works these facilities shall revert to the Contractor who shall remove them from the site.

The term "use of the Engineer" will be deemed to include, as appropriate, use by the Engineer's staff and the Engineer's Representative and his staff.

PS6-2 Other facilities required

The Contractor shall make medical facilities and safety equipment available in accordance with PSA4-1.

a) Storage of perishable products:

Cement and other perishable products shall be stored under cover on a wooden floor, which does not rest on natural ground.

PS7 FEATURES REQUIRING SPECIAL ATTENTION

PS7-1 Existing services (Subclause 5.1.2 of SABS 1200 D)

PS7-1.1 General

A number of services, consisting mainly of fences, drainage, water and sewer pipelines varying in diameter of 75 mm to 400 mm, Telkom cables, LT and HT electric power cables and overhead lines will be encountered en route. Every endeavor has been made to indicate the location and depth of the affected services on the drawings.

No guarantee can be given that all services are indicated or that they are shown in the exact correct location. The Contractor shall contact each property owner before his property is crossed to ascertain the location of the services that may be affected. Once located, the exact location, level and nature of the service shall be given to the Engineer's Representative in writing. See also PSA 5-4.1.

The Contractor shall take special care when excavating the trench, when the trench is open, and when carrying out any work under the Contract, not to damage any existing water mains, sewers, cables or other underground services or to disturb the stability of any poles or towers supporting power line, telegraph and telephone wires, etc. The Contractor shall comply with all the requirements of registered servitude holders whenever and wherever his construction is proceeding within their servitude areas. The Contractor will be held solely responsible for the protection of all services and for any claims for damages arising there from.

PS7-1.2 Overhead power lines

When working in the vicinity of power lines, great care shall be exercised, failing which the use of cranes or mechanical excavations may be restricted or prohibited and excavation by hand

may be required. The additional cost of such hand excavation shall be at the Contractor's expense.

The pipeline crosses the servitude of a number of power lines belonging to Eskom.

The Contractor shall advise the appropriate official of Eskom of when he intends commencing work in the vicinity of overhead power lines, so that safety clearances and the required provisions of safeguarding of stay wires can be decided.

PS7-1-3 Telkom and high tension power cables

Before any excavation is carried out within 10 m of the approximate position of an underground Telkom or HT cable the Contractor shall notify the owner of the cable and the Engineer in writing that the crossing is to be made and ascertain and comply with any conditions that have been imposed for the crossing. No excavation shall be carried out within 10 m of the cable until the cable has been exposed and protected by the owner or by the Contractor with the prior written approval of the owner.

PS7-1.4 Overhead telephone lines

When working in the vicinity of telephone lines great care shall be exercised, failing which the use of cranes or mechanical excavators may be restricted or prohibited and excavation by hand may be required. The additional cost of such hand excavation shall be at the Contractor's expense.

PS7-2 Fences

Where, in the opinion of the Engineer, it is necessary to remove existing fences or portion of fences and gates, the Contractor shall dismantle and stack the various components of the fence at a safe place for later re-erection. No gate, fence or portion of fence shall be removed without the prior written approval of the Engineer. Where the Contractor wishes the fence line to be open for more than one month, he shall erect a temporary fence across the opening at his own expense. On completion of the Contractor's operations in an area, the existing fence line shall be either replaced with new fencing to the identical type or reinstated to at least the standard of the original fence by using the materials which were dismantled and stacked from the existing fence and using new materials to make up any shortfall, all as ordered by and to the approval of the Engineer.

The Contractor is strongly advised to make sketches and where applicable, take photographs of existing fences before they are removed so as to avoid, as far as possible, arguments that may arise between himself and the property owner as to the quality of the re-erected fences.

PS7-3 Normal working hours

If the Contractor is given permission, in terms of Sub clause 38 (1) of the general Conditions of Contract, to work outside the working hours stipulated in Clause 38, he shall arrange with the Engineer, in good time, for watching and supervision of the Work, he shall be responsible for paying the additional costs of watching and supervising incurred by the Engineer and he shall provide adequate lighting for the contraction area and access (es) as necessary.

PS7-4 Road crossings and working within road reserves, etc.

PS7-4.1 Safety

The Contractor shall direct, control, facilitate and safeguard all traffic during construction of the Works, provide all notices, and arrange for watching and lighting in accordance with the requirements of the relevant authorities. (See PSA 5-3)

PS7-4.2 Crossing major roads

At the major road crossings the trenches for the water pipes shall be backfilled with non-cohesive soils as specified in Subclause 5.7.2 of SABS 1200 DB for the full road reserve width. Under the existing or future road surface and shoulder portion of the crossings, the backfilling with non-cohesive soils shall also be cement-stabilized.

Where the pipelines run parallel to the road and are located below the sidewalks, the trenches shall be backfilled in accordance with Subclause 5.9.3 and 5.9.4 of SABS 1200 DB as applicable.

PS7-5 Work in restricted areas

No additional payments will be made for work in restricted areas or for any problems that arise from restricted access to trenches or restricted stockpile areas for excavated material.

There will also be no additional payments made in cases where the Contractor cannot make use of blasting for excavation as a result of the proximity of structures (see PSDB5-6).

PS7-6 Continuance of operation of existing services

The existing services in the area include fences, walls, water pipes with erf connections and water meters, toilet structures with buckets, surfaced and gravel roads, overhead and underground telecommunication cables and overhead and underground power cables.

All existing services shall be maintained in operation, unless prior arrangements have been made with the relevant authority and written permission for an interruption of the service has been granted and adequate notice has been given to the affected residents.

The Contractor shall take precautions to protect all existing services against damage. For this reason it is necessary that the Contractor shall comply with the requirements set out in PSA5-4.

PS7-7 Sanitary conditions

Unhygienic habits and other behavior that may cause contamination of any part of the Works or the surrounding areas are strictly prohibited. The Contractor shall ensure that sanitary conditions prevail throughout the Site and that all his workmen are aware of, and comply with, this rule.

PS7-8-1 Management of stormwater

The Contractor shall be fully responsible to make provision for the management of stormwater from high lying areas adjacent to the works. Special care must be taken for the control of storm water run-off in existing storm water canals and culverts.

PS7-8-2 Finishing and tidying

The general neatness and tidiness of the residential areas along the routes of the water pipelines are of particular concern.

The Contractor shall on a day-to-day basis keep the area of the Works in a condition acceptable to the Engineer.

Progressive and systematic finishing and tidying will form an essential part of this Contract. Under no circumstances shall spoil, rubble, materials, equipment or unfinished operations be allowed to accumulate unnecessarily and in the event of this occurring the Engineer shall have the right to withhold payment for as long as necessary in respect of the relevant works in the area(as) concerned.

On instruction of the Engineer, pre-cleaning of some of the street reserves will be needed and paid separately for before commencing of the Works.

PS 7-9 LABOUR-INTENSIVE CONSTRUCTION

PS 7-9.1 General

The portions of the Works as are listed in sub clause PS 7-10.2 below shall, unless otherwise instructed by the Engineer, be constructed in terms of this Contract utilising labour-intensive construction methods only, in accordance with the further provisions of Part 2

In respect of those portions of the Works which are not listed in sub clause PS 7-10.2, the construction methods adopted and plant utilised shall be at the discretion of the Contractor, provided always that the construction methods adopted and plant utilised by the Contractor are appropriate in respect of the nature of the Works to be executed and the standards to be achieved in terms of the Contract.

PS 7-9.2 Portions of the Works to be constructed by labour-intensive construction methods

The following portions of the Works shall be executed utilising labour-intensive construction methods:

- Painting of road markings (non reflectorised);
- The backfilling of trench excavations excluding areas subjected to traffic;
- Stone pitching, rubble concrete masonry and grassing;
- Fixing of steel;
- All clearing and grubbing on the site;
- The excavation of all pipe and culvert trenches not exceeding 1,5 metres in depth in hand excavate able material, if the total depth of the trench consists of hand excavatable material;
- The backfilling and compaction of all pipe and culvert trenches irrespective of depth but excluding areas subjected to traffic;
- The laying and compaction of bedding for all pipe work;
- The excavation, forming, trimming and compaction of drains, berms, channels, and the like in hand excavate able material;
- Low-volume roads and sidewalks;
- Excavation all mass earth works;
- The loading, transporting and placing all materials;
- The spreading and all processing of material for constructing layers and sidewalks;
- The loading of a concrete mixer, transporting, placing and finishing of all concrete;
- The removal of all oversized materials;
- The shaping, trimming and finishing of all cut and fill slopes;
- Cleaning and tidying up of the site;

- Loading, offloading and haul as per limitations in Part B.

PS 7-9.3 Allowable mechanical plant and equipment

In accordance with the provisions of Part 2, the Contractor may utilise suitable and appropriate mechanical plant and equipment in the following particular operations comprised in such works:

- Mechanical vibration of concrete;s;
- The haulage of materials;
- TLB
- Excavator
- Roller
- Plate Compactor

Provided always that where a maximum size, type or capacity of plant or equipment is indicated above, the plant and equipment utilised by the Contractor shall not exceed that specified for the particular operation without the prior consent of the Engineer. Where no maximum size or type of equipment is specified for an operation listed above, the size, capacity and type of mechanical plant or equipment utilised shall be at the discretion of the Contractor.

PS 7-9.4 Restrictions on the utilisation of personnel in the permanent employ of the Contractor

The Contractor shall limit the utilisation of his permanently employed personnel, on the Contract Works, to that of key personnel only and shall execute and complete the works utilising a temporary workforce employed directly by the Contractor and/or subcontractors/ emerging subcontractors.

PS 7-9.5 Labour-intensive competencies of supervisory and management staff

Established contractors shall only engage supervisory and management staff in labour intensive works that have either completed, or for the period 1 April 2023 to 30 June 2025, are registered for training towards, the skills program outlined in Table 1.

Emerging contractors shall have personally completed, or for the period 1 April 2023 to 30 June 2025 be registered on a skills program for the NQF level 2 unit standard. All other site supervisory staff in the employ of emerging contractors must have completed, or for the period 1 April 2023 to 30 June 2025 be registered on a skills program for, the NQF level 2 unit standards or NQF level 4 unit standards.

Table 1: Skills program for supervisory and management staff

Personnel	NQF level	Unit standard titles	Skills program description
Team leader / supervisor	2	Apply Labour Intensive Construction Systems and Techniques to Work Activities	This unit standard must be completed, and
		Use Labour Intensive Construction Methods to Construct and Maintain Roads and Stormwater Drainage	any one of these 3 unit standards
		Use Labour Intensive Construction Methods to Construct and Maintain Water and Sanitation Services	
		Use Labour Intensive Construction Methods to Construct, Repair and Maintain Structures	
Foreman/ supervisor	4	Implement labour Intensive Construction Systems and Techniques	This unit standard must be completed, **and**
		Use Labour Intensive Construction Methods to Construct and Maintain Roads and Stormwater Drainage	any one of these 3 unit standards
		Use Labour Intensive Construction Methods to Construct and Maintain Water and Sanitation Services	
		Use Labour Intensive Construction Methods to Construct, Repair and Maintain Structures	
Site Agent / Manager (i.e the contractor's most senior representative that is resident on the site)	5	Manage Labour Intensive Construction Processes	Skills Program against this single unit standard
Details of these skills programs may be obtained from the CETA ETQA manager (e-mail: gerard@ceta.co.za, Tel: 011-265 5900)			

PS 7-9.6 Employment of unskilled and semi-skilled workers in labour-intensive works

PS 7-9.6.1 Requirements for the sourcing and engagement of labour

Unskilled and semi-skilled labour required for the execution of all labour intensive works shall be engaged strictly in accordance with prevailing legislation and SANS 1914-5, Participation of Targeted Labour.

The rate of pay set for the SPWP is R 260.00 per task or per day.
Tasks established by the contractor must be such that:

a) the average worker completes 5 tasks per week in 40 hours or less; and
b) the weakest worker completes 5 tasks per week in 55 hours or less.

The contractor must revise the time taken to complete a task whenever it is established that the time taken to complete a weekly task is not within the above requirements.

The Contractor shall, through all available community structures, inform the local community of the labour intensive works and the employment opportunities presented thereby. Preference must be given to people with previous practical experience in construction and / or who come from households:

a) where the head of the household has less than a primary school education;
b) that have less than one full time person earning an income;
c) where subsistence agriculture is the source of income.
d) those who are not in receipt of any social security pension income

The Contractor shall endeavour to ensure that the expenditure on the employment of temporary workers is in the following proportions:

a) 50 % women;
b) 20% youth who are between the ages of 18 and 25; and
c) 2% on persons with disabilities.

PS 7-9.6.2 Specific provisions pertaining to SANS 1914-5

Definitions

Targeted labour: Unemployed persons who are employed as local labour on the project.

Terms and conditions for the engagement of targeted labour

Further to the provisions of clause 3.3.2 of SANS 1914-5, written contracts shall be entered into with targeted labour.

Variations to SANS 1914-5

The definition for net amount shall be amended as follows:

Financial value of the contract upon completion, exclusive of any value added tax or sales tax which the law requires the employer to pay the contractor.

The schedule referred to in 5.2 shall in addition reflect the status of targeted labour as women, youth and persons with disabilities and the number of days of formal training provided to targeted labour.

PS 7-9.6.3. Training of targeted labour

The contractor shall provide all the necessary on-the-job training to targeted labour to enable such labour to master the basic work techniques required to undertake the work in accordance with the requirements of the contract in a manner that does not compromise worker health and safety.

The cost of the formal training of targeted labour, will be funded by the local office of the Department of Labour. This training will take place as close to the project site as practically possible. The contractor must access this training by informing the relevant regional office of the Department of Labour in writing, within 14 days of being awarded the contract, of the likely number of persons that will undergo training and when such training is required. The Employer and the Department of Public Works (Fax: 012 3258625/ EPWP Unit, Private Bag X65, Pretoria 0001) must be furnished with a copy of this request.

The contractor shall do nothing to dissuade targeted labour from participating in training programs and shall take all reasonable steps to ensure that each beneficiary is provided with two days of formal training for every 22 days worked.
An allowance equal to 100% of the task rate or daily rate shall be paid by the contractor to workers who attend formal training as described.

Proof of compliance with the above requirements must be provided by the Contractor to the Employer prior to submission of the final payment certificate.

PS7-9.6.4 Classification of Excavations

Hand excavatable material

Hand excavatable material is material:

a) granular materials:

i) whose consistency when profiled may in terms of table 1 be classified as very loose, loose, medium dense, or dense; or

ii) where the material is a gravel having a maximum particle size of 10mm and contains no cobbles or isolated boulders, no more than 15 blows of a dynamic cone penetrometer is required to penetrate 100mm;

b) cohesive materials:

i) whose consistency when profiled may in terms of table 1 be classified as very soft, soft, firm, stiff and stiff / very stiff; or

ii) where the material is a gravel having a maximum particle size of 10mm and contains no cobbles or isolated boulders, no more than 8 blows of a dynamic cone penetrometer is required to penetrate 100mm;

Note: 1) A boulder, a cobble and gravel is material with a particle size greater than 200mm, between 60 and 200mm.

A dynamic cone penetrometer is an instrument used to measure the insitu shear resistance of a soil comprising a drop weight of approximately 10 kg which falls through a height of 400mm and drives a cone having a maximum diameter of 20mm (cone angle of 60° with resepect to the horizontal) into the material being used.

Table 1: Consistency of materials when profiled

GRANULAR MATERIALS		COHESIVE MATERIALS	
CONSISTENCY	**DESCRIPTION**	**CONSISTENCY**	**DESCRIPTION**
Very loose	Crumbles very easily when scraped with a geological pick.	Very soft	Geological pick head can easily be pushed in as far as the shaft of the handle.
Loose	Small resistance to penetration by sharp end of a geological pick.	Soft	Easily dented by thumb; sharp end of a geological pick can be pushed in 30-40 mm; can be moulded by fingers with some pressure.
Medium dense	Considerable resistance to penetration by sharp end of a geological pick.	Firm	Indented by thumb with effort; sharp end of geological pick can be pushed in up to 10 mm; very difficult to mould with fingers; can just be penetrated with an ordinary hand spade.
Dense	Very high resistance to penetration by the sharp end of geological pick; requires many blows for excavation.	Stiff	Can be indented by thumb-nail; slight indentation produced bypushing geological pick point into soil; cannot be moulded by fingers.
Very dense	High resistance to repeated blows of a geological pick.	Very stiff	Indented by thumb-nail with difficulty; slight indentation produced by blow of a geological pick point.

Trench excavation

All hand excavateable material in trenches having a depth of less than 1,5 metres shall be excavated by hand.

Compaction of backfilling to trenches (areas not subject to traffic)

Backfilling to trenches shall be placed in layers of thickness (before compaction) not exceeding 100mm. Each layer shall be compacted using hand stampers.

a) to 90% Proctor density;
b) such that in excess of 5 blows of a dynamic come penetrometer (DCP) is required to penetrate 100 mm of the backfill, provided that backfill does not comprise more than 10% gravel of size less than 10mm and contains no isolated boulders, or
c) such that the density of the compacted trench backfill is not less than that of the surrounding undisturbed soil when tested comparatively with a DCP.

Excavation

All hand excavateable material including topsoil classified as hand excavateable shall be excavated by hand. Harder material may be loosened by mechanical means prior to excavation by hand.

The excavation of any material which presents the possibility of danger or injury to workers shall not be excavated by hand.

PS 7-9.7 LOCAL SUBCONTRACTORS / EMERGING SUBCONTRACTORS

(a) It is a Project Specific Target that 30% of the value of the Contract shall be sublet to emerging subcontractors. See CT.23 for the implementation of this clause.
(b) The Main Contractor is to provide contract security for the whole Contract.
(c) The Main Contractor will be required to manage these subcontracts.

Payment for the management of these subcontracts must be included in the tendered rates.

Should it become apparent that the Subcontractor is not able to progress satisfactorily with the subcontract, the Contractor can submit a written request to the Engineer to complete the subcontract with his permanently employed non-key personnel or his own temporarily employed workforce at his tendered rates.

Circumstances, inter alia, which may also be considered to warrant such authorisation by the Engineer includes:
(i) non-receipt of valid tenders from small subcontractors
(ii) default or failure of appointed small subcontractors.

The onus shall rest fully on the Contractor to help the subcontractor on a monthly basis to prepare a certificate in accordance with the provisions of the subcontract, to certify it and to submit it to the Engineer for approval within seven days from the closing date of the month.

PS7-9.8 CONTRACTORS OBLIGATIONS

The Contractors is to supply the Engineer with copies of the agreements between himself/herself and his/her subcontractors within twenty-one (21) days of the contract being awarded.

Should the Contractor be unable to or unwilling to:

i) Subcontract the required Works as detailed in his/her tender document;

ii) Submit the necessary documentation to prove that he/she is subcontracting the work as specified in paragraph PS7-10.7;

iii) Implement his/her proposed training scheme or any other scheme agreed to by the relevant parties;

The Employer reserves the right to:

a) nullify the said contract and re-issue it to another suitable tenderer;
b) nominate available local subcontractors for the required Works;
c) deduct payment from the monthly certificate, the value of which will be calculated as follows:

X = Y-Z
X = Amount of deduction from the monthly certificate
Y = Value of the work that should have been undertaken by the subcontractor during the month
Z = Value of the work actually undertaken by the subcontractor during the month.

d) nominate agents to undertake the proposed training at the expense of the Contractor.

The Contractor will be liable for any additional costs incurred as a result of a), b), c), or d) above.

PS7-10 Fencing required for camps

The Contractor shall erect temporary fences where required for the execution of the Works, where shown on the drawings and in place of existing fences which have to be temporarily relocated. All fences shall be maintained during construction.

PS7-11 Protection of the environment

No fires may be lit except at places approved by the relevant authority. The Contractor shall ensure that the fire hazard on and near the Site is reduced to a minimum and shall take immediate and effective steps to extinguish any fire that may break out. Burning of vegetation and trees cleared from the Site and/or any other material may only be done on site if permitted in writing by the relevant authority, and shall then be strictly controlled by a competent supervisor, shall be carried out strictly in accordance with any directions given and shall be carried out solely at the risk of the Contractor.

PS7-12 Connection to existing services

All connections to the existing water and sewerage pipelines shall be undertaken in a manner and at times to be approved by the Engineer. It is anticipated that this work may have to be done at night in order to minimize inconvenience to users. No claims for additional payment will be considered in this regard.

PS7-13 "As –built" drawings

As the work progresses, the Contractors shall keep full records of all amendments to and deviations from the drawings as issued to the Contractors at the start of the Contract. The true positions, invert levels and ground levels of all services shall be indicated on the drawings, for which purpose the Contractor shall receive a separate complete set of drawings from the Engineer, at no cost.

The Completion Certificate shall only be issued after the Engineer has received a properly completed set of "as-built" drawings from the Contractor. No separate payment shall be made for this service and all costs related thereto shall be deemed to be included in the tendered rates.

PS7-14 Work outside normal working hours

If the Contractor is given permission, in terms of Sub Clause 38 of the General Conditions of Contract, to work outside the working hours stipulated in Clause 38, he shall arrange with the Engineer, in good time, for watching and supervision of the Works, he shall be responsible for paying the additional costs of watching and supervising incurred by the Engineer and he shall provide adequate lighting for the construction area and accesses as necessary.

PS7-15 Lighting

Should the Contractor wish to work when the natural daylight is inadequate for the type of work to be undertaken, he shall, at his own expense, provide and maintain in good condition, adequate high powered flood lighting for portions of the work over which he is operating.

PS7-17 Occupational Health and Safety Specification

The contract requires the Contractor to excavate in public areas, in residential as well as business and industrial areas where pedestrians and vehicular traffic will be encountered. The Contractor shall protect the site of works from the public for the duration of the activities at the various sites. Before the Contractor leaves a site, the surface shall be reinstated to its original state before construction started.

The Contractor shall apply suitable proven methods for construction so that his activities will not constitute a hazard to the public or any adjacent property. All excavations shall be suitably safeguard and barricaded especially during night-time, weekends or holidays and any other day of inactivity by the Contractor.

The Contractor shall also ensure that excavations are shored or otherwise made safe. No additional payment will be made to the Contractor for complying with these requirements.

The excavations will be in developed areas. The Engineer submitted the drawings to various service authorities to mark their services on the drawings. The Contractor shall take care in excavation and assume that there may be services such as high voltage cables even though it is not marked on the drawings. The Contractor shall take note of the possibility of overhead services and plan accordingly.

The Contractor shall be responsible for the protections of person, animals, vehicles and property against injury or damage by reason of the Works and shall employ competent watchmen to guard the Works both day and night.

The Contractor shall provide, erect and maintain adequate warning signs, fences, barricades, guardrails, temporary bridges and such other protective measures as may be necessary form time to time to the approval and satisfaction of the Engineer.

Storm –water structures are constructed where sudden storm-water run-offs occur. The danger of storm-water and the slippery conditions created by water should be taken into consideration in the Contractor’s Health and Safety Plan.

The Contractor’s Occupational Health and Safety Plan must be approved by the Employer before any construction work may commence. In case of a variation order the Contractor shall do a risk assessment of the work involved in the VO and if necessary must adjust his Occupational Health and Safety Plan accordingly.

Refer to the Annexure 2 of the Tender Data for additional details of the Health and Safety Specifications.

PS8 COMMUNITY LIAISON AND COMMUNITY RELATIONS

PS8.1 General

The construction site is situated in a built-up area and the Contractor shall ensure the least possible disruption of movement of the public during construction. The Contractor shall be responsible for liaison with the Community Liaison Officer (CLO) in respect of construction activities next to private properties and entrance to properties. No separate payment will be made in this regard.

PS8.2 Project Steering Committee (PSC)

A Project Steering Committee (PSC) will be established for the project. The functions and powers of the PSC will be as approved by the Thembisile Hani Local Municipality.

In view of the Contract being executed in various Municipal Wards and to limit representation on the PSC, the PSC will consist of the local Ward Councillors and a total of three community representatives appointed by the Ward Councillors affected by the Works.

The Contractor will liaise with the CLO and Ward Councillors for the permanent appointment of local labour workforce for the duration of the Contract, irrelevant of the work being executed in various wards.

PS8.3 Community Liaison Officer (CLO)

A Community Liaison Officer (CLO) will be appointed by the Contractor only on instruction of the Employer. In the event of an appointment of a CLO, the contractor shall, however, accept the appointment as part of his management personnel.

The CLO's duties will be the following: -

(a) The CLO will liaise with the PSC for the permanent appointment of local labour workforce for the duration of the Contract, irrelevant of the work being executed in various wards.

(b) To be available on site daily between the hours of 07:15 and 10:30 and at other times as the need arises. His normal work day will extend from 07:15 in the morning until 16:45 in the afternoon inclusive of a thirty-minute lunch interval.

(c) To determine, in consultation with the Contractor, the needs of the local labour for relevant technical training. He will be responsible for the identification of suitable trainees and will attend one of each of the training sessions.

(d) To communicate with the Contractor and the Engineer to determine the labour requirements with regard to numbers and skill, to identify possible labour disputes and to assist in their resolution.

(e) To attend all meetings in which the community and/or labour is present or is required to be represented. In particular he will attend the first part of the monthly Site Meeting to report on local community labour involvement.

(f) To report to and liaise with the Project Steering Committee.

(g) To inform local labour of their conditions of employment and to inform local labourers as early as possible when their period of employment will be terminated.

(h) To ensure that all labourers who are involved in activities where tasks have been set are fully informed regarding the principle of task work.

(i) To attend disciplinary proceedings to ensure that hearing are fair and reasonable.

(j) To receive and attend to any complaints lodge by PSC and members of the community.

(k) To keep a daily written record of his interviews and community liaison.

(l) All such other duties as agreed upon between all parties concerned.

(m) To prevent any interference with any matter that is in conflict with the relevant contract as approved by the Thembisile Hani Local Municipality, that could have a direct influence on the technical specification or the conditions of contrast as set out in the relevant contract documents.

(n) To ensure that no member of the PSC or any member of the community put any pressure on the consultant and/or the contractor involved to make any financial or other contribution to individuals or the community as a whole without the knowledge of the Thembisile Hani Local Municipality.

(ii) Payment of the CLO and the PSC members

Remuneration of the CLO will be **R 14,000 per month**. A special item is incorporated in Section A: Preliminary and General of the Schedule of Quantities relating to payment of the CLO on a provisional sum basis.

The Contractor shall give to the CLO, at the earliest opportunity, written notice of the termination of the project, provided always that such notice shall not be less than one month.

PS9 TRAINING OF LOCAL LABOUR

Certain members of the Contractor's staff will be selected from the locally recruited employees, to be subjected to training in tasks related to the execution of the contract. An item with a provisional sum to cover the cost of training is included in the Schedule of Quantities.

The PSC will select the trainees and decide upon the specific training for each of them. The Contractor must guide PSC in this regard and make all the necessary arrangements with the training institutions and the trainees, to ensure that the process runs smoothly. All other costs, including transport of trainees, will be borne by the Contractor and should be included in the percentage handling fee of the Contractor.

PS10 EXTENSION OF TIME RESULTING FROM ABNORMAL RAINFALL

Extension of time will not be considered for normal adverse weather conditions but only for abnormal rainfall or saturated conditions and will be, calculated in accordance with the following method:

(a) The Contractor shall, in his program, allow for the expected number of working days on which work could be delayed - as given in the Schedule below.

(b) Extension of time will be calculated for each calendar month or part thereof over the full period for the completion of the Work, plus any approved extension thereof, as follows:

(i) A delay caused by abnormal weather conditions will only be accepted for extension of time if, in the opinion of the Engineer, it delays a item or items which lie on the critical path determined by the Contractor's program. Only delays on working days will be considered.

(ii) An extension of time will be granted for the number of days, as approved, on which adverse weather conditions occur (rainfall in excess of 10mm/day), less the anticipated number of days given in the Schedule overleaf.

(iii) The net extension of time determined for each month, which may be negative, shall accumulate algebraically to determine the net number days for extension of time due to abnormal weather conditions, but a negative total at the end of the Completion Period will not be taken into account.

(iv) Where a portion of a month is involved, a pro rata number of days shall be calculated.

SCHEDULE

Anticipated number of working days on which work could be delayed as a result of adverse weather conditions.

Month	Days	Month	Days
January	6	July	0
February	6	August	0
March	4	September	5
April	1	October	6
May	1	November	6
June	0	December	6

PS.11 STANDING TIME

Should the Works be suspended in terms of Clause 39 of the General Conditions of Contract for Construction Works (3rd Edition, 2015) or should standing time be incurred by the Contractor in terms of (but not limited to) the provisions of Clause 16(2), 32(3), 41, 42(33) or 46(4) of the GCC, then the Contractor may be entitled to claim in terms of Clause 51 of the GCC for:

i) An extension of time;
ii) Additional Preliminary and General allowance only.

PART 2: VARIATIONS TO SPECIFICATIONS LISTED IN THE LIST OF APPLICABLE SPECIFICATIONS AND ADDITIONAL CLAUSES

PSA GENERAL (SABS 1200A)

PSA2 Interpretation

PSA2-1 Applicable edition of standards (Sub clause 2.2)

Add at the beginning of Sub clause 2.2.

"Unless a specific edition is specified (see the list of Applicable Specifications),....."

PSA2-2 Definitions and abbreviations (Sub clause 2.3 and 2.4)

The term "ESCOM", "ESC" and "Electricity Supply Commission" shall mean "Eskom".

The terms "GPO", "P&T", and "Department of Posts and Telecommunications" shall mean "Telkom SA Limited".

The term “SANRAL” shall mean the South African National Roads Agency Limited”

PSA2-3 Abbreviations (Sub clause 2.4)

Add to Sub clause 2.4(b):

"MAMDD: Modified AASHTO maximum dry density".

PSA2-4 Items in Schedule of Quantities (Sub clause 2.8.1)

In the fourth line of Sub clause 2.8.1, after the word "specification", add: "or in the measurement and payment clause of the standard specification, particular specification or project specification".

PSA3 Materials

PSA3-1 Quality (Sub clause 3.1)

Where a material to be used in this Contract is specified to comply with the requirements of an SABS Standard Specification, and such material is available with the official SABS mark, the material used shall bear the official mark.

PSA4 Plant

PSA4-1 Medical facilities and safety equipment

The suitable first aid services required in terms of Sub clause 20(1) of the General Conditions of Contract and Sub clause 4.2 of SABS 1200 A shall include, inter alia, a First Aid cabinet fully equipped and maintained with at least the minimum contents as listed in the Annexure (Regulation 3) to the General Safety Regulations of the Occupational Health and Safety Act,

1993 (Act 85 of 1993), to deal with accidents and ailments which are likely to occur during the construction period.

The Contractor shall provide personal protective equipment and facilities as required by Regulation 2 of the General Safety Regulations of the Occupational Health and Safety Act, 1993 (Act 85 of 1993).

PSA4-2 Latrine facilities (Sub clause 4.2)

The suitable sanitary services required by Sub clause 20(1) of the General Conditions of Contract, shall be of the bucket or chemical type and shall be readily accessible to workers at all areas of the site.

The Contactor shall make all the necessary arrangements with the relevant local authority for the disposal of the contents of the toilets on a regular basis.

PSA5 Construction

PSA5-1 Setting out of the Works and preservation of pegs (Sub clause 5.1.1 and 5.1.2)

All block corners and individual stands have been pegged by the Land Surveyor and these pegs shall be used as basic control points for setting out the Works.

The Contractor shall provide a list of all pegs that are in their correct position in accordance with Sub clause 5.1.2. Payment will be made under Item A4.2 of the Schedule of Quantities for the replacement of pegs that were not in their correct positions and otherwise in accordance with Sub clause 5.1.2.

All corner pegs and pegs at direction changes on the outside figure of all blocks shall be protected by driving a fencing standard of length approximately 1,5 m to a depth of 700 mm into the ground 300 mm away from each peg within the road reserve. These markers shall be painted a bright colour and shall not be disturbed unless absolutely necessary for the execution of the work. The disturbed standards shall be replaced after completion of work around them.

The Contractor shall advise the Engineer of any conflict between the position of any part of the Works and an existing feature. Before commencing any construction, the Contractor shall check the relative positions and levels of all reference pegs, bench marks and line pegs and inform the Engineer of any discrepancy in writing at least seven days before he intends to start construction, so as to allow the Engineer to do a check survey.

Before any work is taken over by the Engineer a certificate from a Land Surveyor stating that all erf pegs that were in the correct position before commencement of the Work, are in the correct position shall be submitted by the Contractor.

PSA5-2 Survey beacons (Sub clause 5.1.2)

Before the Contractor commences any work on the erven, he shall search for the erf pegs. If any erf pegs are missing, he shall immediately inform the Engineer in writing. The Contractor shall be solely responsible for the protection of survey beacons.

PSA5-3 Safeguarding and accommodation of traffic

PSA5-3.1 General

With reference to Sub clause 5.2 of SABS 1200 A, the Contractor shall in addition to the requirements of Sub clause 5.1.6 of SABS 1200 D, carry out and maintain such temporary works and provide all temporary road signs, pipes, deviations and the like, as are necessary to maintain and safeguard the normal flow of public and private, vehicular and pedestrian traffic.

Unless the closing of accesses and through fares has been properly arranged, the Contractor shall accommodate and provide for through traffic and vehicular access to houses and buildings at all times. If necessary, safe ramps to mount road kerbs shall be provided where traffic is to be diverted.

PSA5-3.2 Temporary traffic signs, barriers and flashing lights

PSA5-3.2.1 Temporary road signs, delineators and barricades

Temporary road signs shall include all road signs in the regulatory, warning, information and guidance in SARTSM. The road signs shall be made of 1,4 mm thick steel sheets, 1,4 mm thick "Chromadek" or any other material approved by the Engineer. The background, letter and symbols of all signs shall be of engineering-grade retro-reflective material.

Road signs shall either be mounted on poles, planted in the ground or on stands to facilitate ease of movement. The stands provided shall have a base on which ballast can be placed such that signs are not affected by wind or passing traffic.

Barricades shall be mounted on stands and shall be either a TR15 and DTG106 combination or a TR17 and DTG 106 combination.

PSA5-3.2.2 Mounting of signs

Signs may either be mounted on wooden posts fixed firmly in the ground or mounted on suitable stands in order to facilitate removal and replacement.

PSA5-3.2.3 Channelization devices

Channelization devices shall include delineators and traffic cones. Delineators shall be mounted such that they are not blown over by the wind or the movement of passing traffic. Delineators shall comply with the requirements of SABS 1555: 1992.

PSA5-3.2.4 Flashing lights

Flashing lights shall be bi-directional, amber warning lights of the Zenin type with a lens diameter not less than 170 mm and a flashing frequency of 75 to 95 flashes per minute.

PSA5-4 Existing services (Sub clause 5.4)

PSA5-4.1 Action by Contractor (Subclause 5.4)

Various services are known to exist. Their approximate positions are shown on the drawings but, although they are based on the best information available, their accuracy cannot be guaranteed. It is likely that other services that are not shown on the drawings exist along the route of the pipeline, and in the vicinity of the proposed works.

All services, in particular cables, shall be treated as live until proven otherwise.

Before the commencement of any excavation the Contractor shall confirm the name and telephone number of the relevant officials, business people and/or owners directly concerned with the known or suspected services, shall acquaint himself with the position of the control points of the services and shall have readily available the equipment necessary to shut-off and isolate any such service.

The Contractor shall liaise with the relevant authorities or controlling bodies for the necessary temporary closure of any services during construction.

The Contractor shall not commence work in any area until proper arrangements have been made for supervision of the work by the relevant authority.

Before commencing any excavation for trenches or road works in a specific area, the Contractor shall locate all existing services with the co-operation of the relevant authority, and carefully excavate by hand, expose and survey such services. If the information regarding any existing service as given in the drawings is either missing, incomplete or erroneous, the Contractor shall, as soon as the service has been located, submit details of the exact location, depth and type of service in writing to the Engineer.

Before any work that involves services to any property is carried out, the Contractor shall serve notice on the resident, occupier and/or owner of every property, at least 3 working days in advance of any temporary disconnection, advising the nature, time and duration.

In addition to the requirements of Sub clause 5.4 the Contractor shall deal with the crossing of known existing services by the pipelines by:

a) Notifying to the Engineer's Representative and the relevant authority 48 hours prior to executing the work.
b) Serving notice on the resident, occupier and/or owner of every property affected at least 36 hours in advance of any temporary disconnection, advising the nature, time and duration.

c) excavating by hand, under the supervision of the Engineer's Representative and/or the authority involved, on the line of the trench up to 2 m, or such for the distance as may be necessary, in both directions from the indicated position to locate the exact position of the services.

PSA5-4.2 Liaison with service authorities

PSA5-4.2 Work done by service authorities

The Contractor shall liaise closely with service authorities regarding the following matters:

a) Dealing with traffic.
b) Locating of existing underground services.
c) Protection of existing services during construction (especially optic fibre cables).
d) Excavation to expose power supply cable to lampposts.
e) Excavation to expose high tension cables, backfilling after the cable had been moved, and excavating and backfilling new trench.
f) All the relevant authorities were notified of above operations.

At the start of the Contract, a list of people who can be contacted will be given to the Contractor. It is then the Contractor's onus to immediately contact all these authorities and to accommodate their involvement in his program of work. Compensation for delays, losses or accidents will not be considered should the Contractor at any time have failed to keep the local authorities informed.

After the site has been handed over, the Contractor shall obtain the telephone numbers and contact persons at each of the relevant service authorities for the possible event of services being damaged. These numbers shall be prominently displayed in the Contractor's site office, preferably near the telephone or radio, before the first payment certificate will be issued.

In the event of an existing service being damaged, the Contractor shall immediately contact the relevant service authority, after which he shall notify the Engineer or his representative, who will investigate the matter and determine liability for the damage.

The engineer or Employer must immediately be notified should the Contractor experience any problem regarding work which involves a local authority.

PSA5-4.2 Underground telephone lines and power cables

Before any excavation is carried out within 10m of the approximate position of an underground telephone or power cable, the Contractor shall notify the owner in writing two weeks in advance to ensure that he is informed of any conditions or precautions that must be taken.

No excavations within 10m of the cable may be carried out before the cable has been opened up by the owner, identified and protected. If the Contractor is requested to expose the service he shall first obtain a written order to do so from the owner.

PSA5-4.3 Above ground telephone lines and power lines

Great care shall be taken when working in the vicinity of above ground cables. Where the necessary care is not properly exercised, the use of mechanical cranes or excavation machines may be limited or totally prohibited in which case the relevant excavations shall be done by hand at the additional expense of the contractor. Before any operation in the vicinity of any above ground cables is carried out, the Contractor shall notify the owner in writing of the date and time when he proposes to work in order that protection of the cables and anchor cables can be arranged.

PSA5-4.4 Existing pipelines

Where the proposed line cross or run parallel to existing pipelines, the Contractor shall expose the existing pipelines by hand excavation for such length as necessary but not less than 2m.

The Contractor shall put in place such temporary measures, which shall be subject to the approval of the Engineer, to protect the existing pipeline during the construction of the proposed pipeline.

PSA5-4.5 Surface drainage furrows

Where the proposed pipeline and necessary drainage furrows cross, the Engineer may order that the pipe at the point of crossing be encased in concrete. The concrete encased shall have a minimum thickness of 150mm around the outside diameter of the pipe, the concrete mix shall be Grade 15Mpa 20mm and the length shall be as determined by the Engineer. On either of the encasement a flexible joint shall be constructed in the pipeline.

PSA5-4.6 Work done by service authorities

The Contractor shall give assistance to service authorities with the location, protection, alteration and/or removal of service controlled by that authority.

PSA5-4.7 Existing fences, walls and structures

Where, in the opinion of the Engineer, it is necessary to remove the existing fences, walls or other structures or opinions thereof, the Contractor shall remove and store the separate components in a safe place for their reinstatement.

None of these structures shall be removed without the prior written approval of the Engineer. As soon as possible after completion of the Contractor's work in the area, he shall replace the removed fences, walls or structures with new material of a similar standard as the original or with salvaged material, all to the original standard and satisfaction of the Engineer.

No payments will be made where the Contractor removes existing fences or the structures for portions thereof to accommodate his construction methods or plant. (See also PS7-5)

Before fences, walls or other structure are removed on the order of the Engineer, the Contractor shall make sketches to the satisfaction of the Engineer and, if necessary, take photographs of such items. These sketches or photographs shall be given to the Engineer in the order that the quality of the replaced item can be compared to that of the original.

PSA5-4.8 Existing streets

Before any work that will affect the existing street surface and sidewalks is carried out, the condition thereof shall be carefully recorded by the Contractor and confirmed by the Engineer's Representative. The Contractor shall also submit photographs of such areas to the Engineer before construction commences.

Immediately after construction of pipelines in a particular block has been completed, street and sidewalk surfaces shall be repaired to at least the condition before construction commenced.

In particular, the surface layer and other road construction layers shall be mixed with foreign material, all to the original standard and satisfaction of the Engineer.

No payments will be made where the Contractor removes existing fences or structures for portions thereof to accommodate his construction methods or plant. (See also PS7-6)

Before fences, walls or other structures are removed on the order of the Engineer, the Contractor shall make sketches to the satisfaction of the Engineer and, if necessary, take photographs of such items. These sketches or photographs shall be given to the Engineer in order that the quality of the replaced item can be compared to that of the original.

PSA7 Testing

PSA7-1 Checking

The Contractor shall carry out sufficient checks to satisfy himself that the materials used and workmanship (i.e the quality of construction, adherence to tolerances and, when applicable, the strength attained) comply consistently with the specified requirements and the results of those checks shall, if so ordered, be made available to the Engineer. The Engineer may carry out such checks as he deems necessary at any point or at any depth or on any layer, as applicable, and the results of the Engineer's checks shall be made available to the Contractor.

PSA7-5 Standard of Finished Work not to Specification

Where the Engineer's checks reveal that the material used or the construction or tolerance standard achieved does not comply with the applicable requirements of the specification, or that the specified strength or density has not been attained, the Contractor shall so rectify the work that the materials, construction, construction or tolerance standard, as applicable, comply with the said requirements or that the specified strength or density, as applicable, is attained.

PSA7-3 Quality Control and Testing

The Contractor shall engage the services of an approved laboratory for the testing of materials and the quality of testing of completed work, to ensure that his work complies with the Specifications.

No separate payment will be made for such testing, the cost of which will be deemed to be included in the Contractor's tendered rates for the items of work that require testing in accordance with the Specifications.

Should the testing laboratory proposed by the contractor not be approved by the Engineer, the contractor shall at his own cost negotiate with and proposed another laboratory.

PSA8 Measurement and payment

PSA8-3 Facilities for Engineer (Sub clause 8.3.2.1 and 8.4.2.1)

The sums tendered for Items A1.2 and A2.2 shall cover the costs of providing and maintaining all the facilities as detailed in PS6.

Payments for "Operation and maintenance of facilities for the Engineer", in accordance with Sub clause 8.4.2.1, will not be authorized by the Engineer until the name boards have been erected and approved.

PSA8-4 Sums stated provisionally by Engineer (Sub clause 8.5)

Amend the penultimate sentence of Sub clause 8.5 to read:

"The percentage rate for (b)(2) above shall cover the Contractor's overheads, charges and profit on the work covered by the sums provisionally stated for (b)(1) above. Payment will be made on the basis of the sums actually paid for such work, exclusive of VAT."

PSA8-5 Scope of Training

The training shall be aimed at targeted labour and shall focus on areas critical to the execution of the works and workplace compliance. The following training programmes shall be provided (but are not limited to): Safety Representative Training, First Aid Training (Level 1), Basic Firefighting Training, Toolbox Training (Basic Site Safety)

PSA8-8 Dealing with traffic (Sub clause 8.8.2)

Dealing with traffic, the maintenance of access, protection at road crossings and other requirements of PSA5-3 will be covered by Item A7.1. No additional payments will be made for dealing with the control of traffic.

PSA8-9 Existing services: work carried out by service authorities (Sub clause 8.8.4)

A Provisional Sum is included in the Schedule of Quantities, under Item A5.1.1 to cover the cost of work on existing services by service authorities.

The cost of work carried out by the relevant service authorities, such as locating, protection and temporary or permanent deviation of existing cable, pipes, overhead services, etc., shall be paid by the Contractor. The Contractor shall arrange with such authorities to have the accounts forwarded directly to him, and shall settle the accounts forthwith, after which the recoverable sums will be paid under the appropriate Provisional Sum item.

The Contractor's costs in connection with work carried out by service authorities will be measured and paid separately as a percentage of the abovementioned sum. The percentage shall cover the costs of all administrative and supervisory costs and profit, as well as the cost of the Contractor's liaison and aid to the authorities in locating and protecting the abovementioned services and any other costs resulting from the work of the authorities in locating and protecting the abovementioned services.

Of the Contractor is required to assist the relevant authority in the location, protection or deviation of the services, beyond the requirements covered by the rated for dealing with the existing services which will be measured and paid in accordance with Sub clause 8.3.5 of SABS 1200 DB, such further work as is carried out by the Contractor will be measured and paid under Item A6: "Daywork"

PSA8-10 Dealing with existing services (Sub clause 8.8.4)

The following works that are executed by the Contractor on the instruction of the Engineer will be measured and paid under Item A6, "Daywork":

i) All additional work to locate and expose the existing service if the existing service is situated further than 2.0m from the position indicated, (i.e., excluding the initial work within 2.0m from the indicated position).

ii) Work that is carried out by the Contractor with regard to existing services that are not indicated on the drawings and for which the Employer will carry the cost according to Sub clause 5.4, with the exception of activities for which provision is made elsewhere in the Project Specification.

The tendered rated for dealing with existing services shall, in addition to the requirements of Sub clause 8.3.5 of SABS 1200 DB, PSA5-4.4 and PSA5-4.5 (other than careful excavation to locate the service in excess of 2.0m from the indicated position) and any costs resulting from the restrictive influence that existing underground and overhead services and any costs resulting from the restrictive influence that existing underground and overhead services and the proximity of fences may have on the Contractor, and the costs of delays and interruptions in the progress of the work resulting from compliance with the above requirements.

Provided the location and level of service are known or have been determined accurate without excavation and actual exposure, dealing with such existing service will not be measured for payment if the service is at a depth of cover more than 300mm below the in site bottom of the pipe trench, road bed or other excavation (after all unsuitable material has been removed).

Other than payment of the cost of alterations to overhead services and for dealing with and protecting poles affected by the excavations, dealing with and working below overhead wires will not be measured separately for payment as the costs thereof will be held to be covered by the other scheduled items.

Careful excavation carried out by the Contractor on the Engineer's instruction to locate and expose existing services of which the exact location is not known, or where the existing service is found to be further than 2.0m from the position indicated, will be measured by volume. The rate shall cover all costs of materials, labour and plant, indicated, will be measured by volume. The rate shall cover all costs of materials, labour and plant, including specialist-detecting equipment required to locate and expose the service.

Payment for dealing with an existing service will made after all construction over or adjacent to the service and all tests have been completed.

The rate also includes the cost of all special precautions needed to protect the service in the event of blasting.

PSA8-11 Alterations to existing services

Permanent alterations made to existing services by the Contractor will be measured and paid under the relevant scheduled items. The length of a service that is re-laid will be measured in its final position.

The sums or rates shall cover the cost of excavation and backfilling, lifting, recovery of the existing service and laying of the service in the new position and any other related work and materials such as new rubber ring seals, packing, etc., required to complete the alteration. New material required to make up shortfalls resulting from a longer route or damage caused, beyond the control of the Contractor, during recovery, and other work carried out by the

Contractor in making permanent alterations for which no scheduled items apply will be measured and paid under Item A6: "Daywork".

PSA8-12 Dealing with water

The cost of supplying and operating the equipment for de-watering of excavations and controlling of storm water will be held to be included in the tendered sums for Item A7.2 and no separate payment will be made for this work.

The cost involved in the control of surface water, precautions against flooding and the drainage and removal of ground water in the trenches or the protection of the road prism for the proper executions of the Works, will be covered by the sums tendered for Items A1.5 and A2.5. The sums shall cover all costs with regards to the dewatering operations as well as all duties as set out in Sub clause 5.5 of SABS 1200 A, Sub clause 5.1.3 of SABS 1200 D and Sub clause 5.1.2 of SABS 1200 DB.

PSA8-13 Freehaul and overhaul

Notwithstanding any clauses in any Standardized Specification or Standard Specification Section dealing with the definition, measurement and/or payment for transport, freehaul and/or overhaul, no measurement nor payment for overhaul will be made. All haulage will be considered to be freehaul and the cost thereof will be deemed to be covered by the rates in the Schedule on quantities.

PSA8-14 Miscellaneous items

An item, which, in the payment clause column of the Schedule of Quantities, refers to this clause (PSA8-13), will be measured in the unit scheduled.

The sum or rate for such item shall cover the cost of all materials, labour and plant required to execute and complete the work as specified, described in the Schedule of Quantities or shown on the drawing(s).

PSA8-15 Nominated Mechanical and Electrical Sub-Contract(s)

A Provisional Sum is allowed in the Schedule of Quantities for mechanical and electrical work to be carried out by Nominated Sub-Contractor(s).

The Contractor will be given an opportunity to peruse and comment on the General and Special Conditions of Nominated Sub-Contract prior to tender, and will be expected to enter into an agreement with the Nominated Sub-Contractor, based on the Sub-Contract Agreement and Provisions of Sub-Contract (July 1978).

The Contractor’s charges, profit etc, will be paid as an amount which will be the tendered percentage of the actual sub-contract price. Such a sum will be the sole payment to the Contractor for his responsibilities and involvement with the nominated sub-contract and no further payments in terms of Clause (60)b (i) or (ii) of the GCC will be made.

PSAB ENGINEER'S OFFICE (SABS 1200 AB)

PSAB3 Materials

PSAB3-1 Name boards (Sub clause 3.1)

Two name boards, manufactured as specified in Sub clause 3.1 and as shown on the drawing no. P110079/008 shall be provided, and shall be erected, plumb and level, in positions as directed by the Engineer.

PSAB3-2 Office building(s) (Subclause 3.2)

The Contractor shall provide and erect one office (minimum size 10m^2) and conference room (minimum size 20m^2) for the Engineer in accordance with Sub clause 3.2, in the position indicated by the Engineer.

A concrete floor will be permitted for the office provided that it is covered with linoleum. All windows in the office shall be fitted with blinds and burglar proofing over the entire glazed area, and with fly screens over the openings.

In addition to the furnishings specified in Subclause 3.2, the following facilities shall be provided for the office:

a) 1 x plan cabinet (steel),
d) 3 x chairs
b) 1 x air conditioner for warm/cool air, with a cooling capacity of at least 2.0 kW.

e) 1 x table
f) 2 x 15 A power sockets

PSAB3-3 Latrine and ablution facility

The Contractor shall provide, maintain and service one ablution room for the exclusive use of the Engineer.

This room shall be constructed as specified for the Engineer's office, but shall be at least 4 m^2 in size and fitted with one flush toilet and one hand washbasin.

PSAB3-4 Protective clothing

The Contractor shall provide and replace when necessary four sets of safety helmets and rubber Wellington boots (of sizes as required) to members of the Engineer's site staff and their visitors.

PSAB4 Plant

PSAB4-1 Survey equipment

The Contractor shall provide the following equipment for use by the Engineer:

a) 1 x tachometer capable of reading to 20 seconds of arc, with tripod,
b) 1 x engineer's automatic level with tripod,
c) 2 x tachometer staffs with staff bubbles,

d) 1 x level staff with staff bubble,
e) 2 x ranging rods,
f) 1 x builder's spirit level of length 900 mm,
g) 1 x steel tape of length 100 m
h) 1 x pocket tape of length 5 m
i) 1 x 6 V, 8-cell torch with spare batteries, and
j) all steel and wood pegs, concrete, hammers, picks, etc., that the Engineer may require.

The Contractor shall provide proof, at the start of the Contract, that the tachometer and level have recently been serviced by an acceptable institution and shall throughout the period of construction, service and maintain all survey equipment and he shall insure same and indemnify the Employer and the Engineer against all claims for loss, breakage or theft of such equipment.

The tachometer and tachometer staffs may be shared by arrangement between the Contractor and the Engineer, but the other instruments shall be provided for the exclusive use of the Engineer.

The Engineer's level and staffs may be shared by arrangement between the Contractor and the Engineer, but the instruments shall be provided for the exclusive use of the Engineer.

On completion of the Works, the equipment will be returned to the Contractor and Engineer who shall remove it from the Site.

PSAB4-2 Parking facilities

A lean-to carport for two cars, giving protection from the sun, wind and rain, and with a ground surface that is neither dusty nor muddy, shall be provided in a position adjacent to the Engineer's office for the exclusive use of the Engineer.

PSAB5 Construction

PSAB5-1 Site instruction book

Throughout the construction period the Contractor shall supply a carbon triplicate book as a site instruction book.

This book shall be kept on Site and shall be accessible to both the Contractor and the Engineer at all times. It shall be used:

a) by the Contractor for providing the Engineer with any information regarding the construction of the Works which may be requested, and giving notification in writing of inspections, drawings, etc., required by the Contractor, and

b) by the Engineer for the purpose of writing day-to-day instructions and confirming any verbal information or instructions given to the Contractor.

One copy of each site note issued shall remain in the book.

PSAB5-2 Name boards (Sub clause 5.1)

The name boards shall be removed by the Contractor before the issue of the Final Approval Certificate.

PSAB5-3 Key personnel (Sub clause 5.3)

The Contractor shall inform the Engineer of the person to whom he has assigned duties with respect to the Site in terms of the Occupational Health and Safety Act and the person(s) who are in possession of a valid certificate of competency in first aid. The Contractor shall give copies of the minutes of the site safety meetings to the Engineer.

PSAB5-4 Survey assistants and labourers (Sub clause 5.5)

In terms of Sub clause 5.5, two suitable, trained and experienced workmen to be used as survey assistants shall be made available to the Engineer during working hours as and when required. As far as practical the same assistants shall be allocated to the Engineer for the full duration of construction.

PSAB8 Measurement and payment

PSAB8-1 Telephone

Notwithstanding the requirements of Subclause 5.4, the Contractor shall be responsible for the costs of all official telephone calls made by the Engineer to a maximum amount of R 1,000 per month for the full construction period, as well as the costs of the installation and rental. The sums tendered for Items A1.2. and A2.2. shall also cover these costs irrespective of the type of communication provided.

The provisional sum under Item A3.1 provides for payment of the cost of calls that exceed R 1,000 per month, and, in addition, a commission on the amount paid under Item A3.1 will be paid under Item A3.2.

PSAB8-2 Electronic equipment for the Engineer

The Contractor shall pay the Engineer, on the monthly invoice of the Engineer, the rate per month stated in the Schedule of Quantities, and shall recover the same from the Employer under Item A3.3.

The Contractor's overheads and profit on the above monthly payments will be paid at the tendered percentage mark-up on the payments made under Item A3.4.

PSC SITE CLEARANCE (SABS 1200 C)

PSC5 Construction

PSC5-1 Areas to be cleared and grubbed (Sub clause 5.1)

Only the approved minimum area required for the execution of the Works including areas on which material shall be stockpiled for later reuse or on which material shall be dumped and spread, shall be cleared and grubbed.

For the access and site roads the width of clearing shall only be sufficient for the construction of the road i.e. for the cut and fill operations and allowing for side slopes.

No trees with a trunk girth of more than 1 m shall be removed without the written permission of the Engineer.

The vegetation cleared shall be disposed of on the Site by approved means and at places indicated by the Engineer.

All rubble on the Site shall be disposed of as directed in PS5-4.

PSC5-2 Conservation of topsoil (Sub clause 5.6)

Topsoil up to a depth of 150 mm, if available, shall be removed from the above specified cleared areas and stockpiled on approved sites for later re-use. Until required for spreading, the stockpiles of topsoil material shall be stabilized by watering or other approved means.

PSC5-2 Removal of trees

No trees shall be removed or cut down without the approval of the Engineer. A penalty of R 500.00 per tree for damaged or removed trees will be charged.

PSC5-3 Prevention of fires

The Contractor shall at all times take steps to prevent the spread of fires within and without the boundaries of the Site.

PSC5-3 Demolition of existing manholes, catch pits, chambers and pipe outlets

Where shown on the drawings or ordered, manholes, catch pits, chambers and pipe outlets shall be demolished. All metal fittings shall be salvaged and delivered to the Employer's yard. All other rubble shall be disposed of to the approval of the Engineer.

The resulting void shall be backfilled with material of a quality, and compacted to a density, at least equal to that of the adjacent material.

PSC5-4 Disposal of rubble

All rubble and cleared vegetation shall be disposed of on the approved disposal site (see PS5-4).

PSC8 Measurement and payment

PSC8-1 Clear and grub (Subclause 8.2.1)

Site clearance for pipe trenches will not be measured where such trenches lie within the carriageway of any road.

In residential areas, the road reserves and erven are considered clear and the cost for any clearing will be held to be included in the tendered rate for excavation.

Site clearance for storm water drainage canals, streets and channels will be measured by area.

The rate tendered for clearing and grubbing shall cover the cost of disposal of the material on the Site by approved means at places indicated by the Engineer, and for finally covering the disposal area with 150 mm of topsoil.

PSC8-2 Demolition of existing manholes, catch pits, chambers and pipe outlets
(Sub clause 8.2.8)

Where shown on the drawings or ordered, manholes, catch pits, chambers and pipe outlets shall be demolished. All metal fittings shall be salvaged and delivered to the Employer's yard. All other rubble shall be disposed of to the approval of the Engineer.

The resulting void shall be backfilled with material of a quality, and compacted to a density, at least equal to that of the adjacent material.

In addition to the requirements of Sub clause 8.2.8 the rate shall cover the cost of excavation and demolition of the scheduled unit, salvaging and delivery of metal fittings, complete removal of all rubble from the Site, and the supply of material for and backfilling of the voids so formed, including compaction, all to the satisfaction of the Engineer.

PSC8-3 Removal and conservation of topsoil (Sub clause 8.2.10)

The rate tendered for the removal of in-situ topsoil shall, in addition to the items listed in Sub clause 8.2.10, also cover the cost of stabilizing and protecting the stockpiles of topsoil.

PSC8-3 Transport of materials and debris to borrow area

All surplus and unsuitable material from excavation and clearing and grubbing operations shall be removed from the Site by the Contractor and disposed of at the Site as described in PS5-4.

The tendered rate shall cover the cost of loading, transporting, dumping and any charges for the use of the dumping site.

PSD EARTHWORKS (SABS 1200 D)

PSD3 Materials

PSD3-1 Classes of excavation (Subclause 3.1.2)

The excavation of material for the purposes of measurement and payment on this Contract will only be classified as soft or hand excavatable and soft or intermediate excavatable by conventional methods. Soft excavation will be held to include material classified in Subclause 3.1.2 as intermediate excavation. Refer to the table 1 below:

Table 1: Consistency of materials when profiled

GRANULAR MATERIALS		COHESIVE MATERIALS	
CONSISTENCY	**DESCRIPTION**	**CONSISTENCY**	**DESCRIPTION**
Very loose	Crumbles very easily when scraped with a geological pick.	Very soft	Geological pick head can easily be pushed in as far as the shaft of the handle.
Loose	Small resistance to penetration by sharp end of a geological pick.	Soft	Easily dented by thumb; sharp end of a geological pick can be pushed in 30-40 mm; can be moulded by fingers with some pressure.
Medium dense	Considerable resistance to penetration by sharp end of a geological pick.	Firm	Indented by thumb with effort; sharp end of geological pick can be pushed in upto 10 mm; very difficult to mould with fingers; can just be penetrated with an ordinary hand spade.
Dense	Very high resistance to penetration by the sharp end of geological pick; requires many blows for excavation.	Stiff	Can be indented by thumb-nail; slight indentation produced by pushing geological pick point into soil; cannot be moulded by fingers.
Very dense	High resistance to repeated blows of a geological pick.	Very stiff	Indented by thumb-nail with difficulty; slight indentation produced by blow of a geological pick point.

Soft or hand excavateable material is material:

a) granular materials:

i) whose consistency when profiled may in terms of table 1 be classified as very loose, loose, medium dense, or dense; or

ii) where the material is a gravel having a maximum particle size of 10mm and contains no cobbles or isolated boulders, no more than 15 blows of a dynamic cone penetrometer is required to penetrate 100mm;

b) cohesive materials:

i) whose consistency when profiled may in terms of table 1 be classified as very soft, soft, firm, stiff and stiff / very stiff; or

ii) where the material is a gravel having a maximum particle size of 10mm and contains no cobbles or isolated boulders, no more than 8 blows of a dynamic cone penetrometer is required to penetrate 100mm;

Note: 1) A boulder, a cobble and gravel is material with a particle size greater than 200mm, between 60 and 200mm.

2) A dynamic cone penetrometer is an instrument used to measure the insitu shear resistance of a soil comprising a drop weight of approximately 10 kg which falls through a height of 400mm and drives a cone having a maximum diameter of 20mm (cone angle of 60° with respect to the horizontal) into the material being used.

Notwithstanding the provisions of Sub clause 3.1.2, the materials excavated, other than hard rock, will be classified on the basis of whether they are excavated by hand or by conventional methods for the purposes of measurement and payment. The unit rate for excavation shall cover the cost of excavation in all materials with the only extra-over items payable being those for excavation in hard rock.

Notwithstanding the provisions of Sub clause 3.1.2, it shall be the responsibility of the contractor to notify the Engineer, at the earliest possible opportunity, if in his opinion; material is classifiable as hard rock. Only where the Engineer has approved the classification of material as hard rock, in writing, will payment be approved as hard rock material, failure by the contractor to obtain this written approval will automatically classify the material as soft excavation.

PSD5 Construction

PSD5-1 Detection, location and exposure of Existing Services (Sub clause 5.1.2.2)

Drawings showing the positions of existing services based on the best information available will be provided to the Contractor. The Contractor shall nevertheless, verify the position of all services and all other obstacles and existing works on the Site before he commences excavations.

The Contractor shall provide and use equipment that is suitable for the location of underground service pipes and cables for as long as is necessary to detect and locate such services, and if so ordered, he shall excavate by hand to expose such services in the area and in a manner and at a time agreed upon with the Engineer.

PSD5-2 Storm water and Groundwater (Sub clause 5.1.3)

See PS7-9.1

PSD5-3 Dust nuisance (Sub clause 5.1.4.1)

Wherever dust from the Works, haul roads, borrow pits or road deviations becomes a nuisance to the public or damages adjacent properties, the Contractor shall, when so ordered by the Engineer, apply sufficient water or take other measures to lay the dust.

PSD5-4 Road traffic control (Sub clause 5.1.6)

In the 4th line of Sub clause 5.1.6 amend "South African road traffic signs manual [1])" to read:

"South African Road Traffic Signs Manual [1])" and Road Signs Note No. 13, Roadworks, Road Traffic Signs Sub-Committee, CSRA (September 1988 1)", and amend the footnote to read:

" 1) Published by the Department of Transport, Pretoria."

Where traffic signals are required, they shall be provided and operated in accordance with the applicable requirements of the South African Road Traffic Signs Manual.

Where work is to be carried out while half of the roadway is closed to traffic, flagmen shall be provided and temporary road signs shall be erected in accordance with the applicable requirements of the South African Road Traffic Signs Manual.

PSD5-5 Recording of original ground profiles

The Contractor will inform the Engineer in writing, at least 14 days before commencing any work which will result in a change in the topography of the site, whether such work be for the permanent works or for temporary works which the Contractor intends to execute for his own convenience. Thereupon, before commencing the work, the Contractor shall assist the Engineer in taking cross-sections of the original ground profiles or another approved method to determine the ground profiles of the entire area to be worked. In addition all rock and/or foundation levels shall be recorded as the work proceeds.

The information so obtained shall be permanently recorded on a drawing or drawings which shall each be signed by both the Contractor and the Engineer. The Contractor shall then provide the Engineer with a reproducible copy of each drawing to serve as a permanent record both for the purpose of determining the quantities of excavation and earthworks carried out in the construction of the permanent works and the extent to which temporary works shall be removed or temporary excavations shall be refilled upon completion of the Works.

PDS5-6 Excavation of hard rock by means of explosives and without explosives

The Contractor shall not use explosives within 8m of any pipeline or within 12m of any building. Should the Contractor elect to excavate hard rock within 16m of any major water main or within 24m of any building without the use of explosives, the Engineer will approve the payment at the tendered rates for the excavation of hard rock without the use of explosives. The application of this ruling will not relieve the Contractor of his responsibilities in accordance with Sub clause 5.1.1.3 or otherwise in terms of the Contract.

PSD5-7 Disposal of material (Sub clause 5.1.4.3 and 5.2.2.3)

All surplus material and all unsuitable material from excavations and clearing and grubbing operations shall be removed from the Site by the Contractor and disposed of at the Site as described inPS5-4.

Dumping shall proceed in an orderly manner with coarse material placed at the bottom and covered with fine material, where possible. Upon completion of dumping the material shall be shaped tp provide free-draining surfaces and slopes and finished off to the satisfaction of the Engineer.

PDS5-8 Shaping of side drains (Sub clause 5.2.4.1)

Along the streets in the residential area of Greenfield, as shown on the drawings and as instructed by the Engineer, the sidewalks shall be graded to form side drains to facilitate the flow of storm water during the final clearance after the installation of the main water pipelines.

PSD5-9 Over-excavation to sides of excavation (Sub clause 5.2.2.1(e))

Where the sides of excavations are over excavated to establish safe slopes, provide access to excavations, or for other purposes not specifically required by the Engineer, such over-excavation shall be backfilled with material as required by the Engineer and compacted as directed.

PDS5-10 Bedding material from borrow pits

Bedding material can be obtained from a municipal borrow pit as per PS5-4. This material can be obtained, on condition that the Contractor stockpiles a volume of similar material at the borrow pit for the Employer, which is equivalent to the volume which the Contractor actually imports to the Site.

PSD5-11 Preparation of founding surfaces below footings and floors

PSD5-11.1 Inspection (Sub clause 5.2.2.1(d))

Excavations to final level, ready to receive a blinding layer, footing or concrete floor slab, shall be completed less than 24 hours before such layer, footing or concrete floor slab is cast.

The Contractor shall arrange for the inspection by the Engineer or his Representative of all surfaces immediately before casting concrete.

PSD8 Measurements and payment

PSD8-1 Existing Services (Sub clause 8.3.8)

The following works that are executed by the Contractor on the instruction of the Engineer will be measured and paid under Item C4.1:

i) Careful excavation carried out by the Contractor on the instruction of the Engineer to locate and expose existing services of which the exact location is not known, or where the existing service is found to be further than 2.0m from the position indicated, will be measured by volume. The rate shall cover all costs of materials, labour and plant, the hire of specialist detecting equipment required to locate and expose the service will be paid separately as a Sum.

ii) Work that is carried out by the Contractor with regard to existing services that are not indicated on the drawings and for which the Employer will carry the cost according to Sub clause 5.4.

Other than payment of the cost of alterations to overhead services and for dealing with and protecting poles affected by the excavations, dealing with and working below overhead wires will not be measured separately for payment as the costs thereof will be held to be covered by the other scheduled items.

PSD8-2 Extra-over payment for excavation classification

No extra-over payment will be made for excavation in material classified in terms of Sub clause 3.1.2 as boulder excavation Class A and Class B. The tendered rate for excavation in all materials shall include for the cost of such excavation.

PSD8-3 Restricted excavation

The volume of restricted excavation will be calculated from the net plan dimensions and profiles shown on the drawing, or the original ground profiles, as applicable, and the final levels shown on the drawings.

PSD8-4 Recording of original ground profiles

The tendered rate for excavation shall cover the cost of recording the original ground profiles, rock and/or foundation levels, as applicable, specified in PSD5-5 and PSD5-6.

PSD8-5 Over-excavation

No separate payment will be made for over-excavation as defined in PSD5-9.

PSDA EARTHWORKS (SMALL EXCAVATIONS) (SABS 1200 DA)

PSDA2 Interpretations

PSDA2-1 Definitions

Backfill: Approved granular material placed in an excavation after specified operations have been performed.

Free haul: Haul of which the cost is included in the scheduled rate for the material hauled and that is not measured separately.

PSDA3 Materials

PSDA3-1 Backfill Material

The backfill material to be used for the base below the toilet Slabs and at areas subject to road loads (crossings) shall be gravel material approved by the Engineer from an approved borrow pit.

PSDA5 Construction

PSDA5-1 Excavation material not to endanger or interfere

All excavated material shall be so deposited as not to interfere with the works, other property or traffic, especially residential properties in the project area.

All material that is unsuitable or not required for backfilling shall be removed from the site and spread, as ordered, on areas designated by the Engineer.

PSDA5-2 Reinstatement and maintenance of roads

The Contractor shall reinstate and maintain the surfaces of all roadways through which trenches or other excavations have been made. Should any subsidence occur at the site of such trench or other excavation, the Contractor shall immediately restore the road surface to its correct level.

PSDA5-3 Compaction

The material to be used as backfill material shall be compacted to at least 93% Mod AASHTO density (and to a higher degree if so instructed by the Engineer)

PSDA5-4 Transport for Earthworks

All haul of material imported from commercial sources or from borrow pits selected by the Contractor (and approved by the Engineer) will be regarded as freehaul.

PSDA7 Testing

PSDA7-1 Material or Compaction Standard not to Specification

The Engineer may carry out such check tests as he deems necessary, at any depth on any layer where the Engineer's test reveal that the material used does not comply with the applicable requirements of the specification, or that the compaction specified has not been attained, the Contractor shall so rectify the work that the material complies with the said requirements and the compaction specified is attained. The Contractor shall also be liable for the cost of all tests that fail to meet the specifications. (see PSDB7-1).

PSDA Measurement and Payment

See PSDB8

PSDB EARTHWORKS (PIPE TRENCHES) (SABS 1200 DB)

There are no variations to Clauses 1, 2, 4 and 6.

PSDB3 Materials

PSDB3-1 Classification of materials

See PSD3-1.

PSDB3-2 Properties of materials for reinstatement of existing road layers

(Subclause 3.6 and 5.9)

The physical properties of the materials to be used in the road layers and the minimum thickness to which each shall be placed, shall comply with the following:

(a) Subbase: 150 mm: PI maximum 10.
CBR at least 45% at 95% of MAMDD
Compaction at least 95% of MAMDD

(b) Base: 150 mm: PI maximum 6.
CBR at least 80% at 98% of MAMDD
Compaction at least 98% of MAMDD

(c) Surfacing: 30 mm: Asphalt surfacing as specified in Subclause 3.6.4

(d) Gravel wearing course: 200mm: PI maximum 14 but not less than 10 The size of the aggregate shall not exceed 40 mm CBR at least 45% at 95% of MAMDD, Compaction at least 95% of MAMDD

PSDB3-3 Selection (Sub clause 3.7)

Notwithstanding Sub clause 3.7, in terms of which the Contractor has a choice regarding methods of selection, the Contractor is required to use selective methods of excavation. The Contractor shall selectively remove and separate the sandy material from unsuitable material and place it adjacent to the trench for re-use as backfill, selected fill, selected granular material or for other use as ordered by the Engineer.

Material which, in terms of Sub clause 6.2 of SABS 1200 D or Sub clause 6.1 of SABS 1200 LB, is too wet for immediate use in the trench (but which is otherwise suitable), will not be regarded as "unsuitable" material and, if so ordered by the Engineer, the Contractor shall spread such material in a suitable area until it has dried sufficiently for later use.

When preparing his program and construction methods, the Contractor shall make allowance for selective excavation and the handling and drying out of material which is too wet for immediate use.

PSDB3-4 Geotextile blanket

The synthetic fibres of a geotextile blanket shall consist of at least 85% by mass of polypropylene, polyethylene, a polyester, a polyamide, or a copolymer of vinyl chloride and vinylidene-chloride, or any combination of these polymers, and shall contain such additives as are necessary to render the filaments resistant to the effects of ultra-violet radiation and heat. The amount of water absorbed by the geotextile after 24 hours soaking in water at 20 deg C shall be less than 1% by mass.

The geotextile shall also comply with the following:

Mass:	210 g/m2 (minimum)
Strength in all directions:	10 kN/m (minimum)
Equivalent opening size (EOS:	105 micrometers (maximum)

The Engineer's approval of the make and grade of the geotextile shall be obtained by the Contractor before the Contractor orders any geotextile or uses it on the Works.

"Bidim: or "Kaymat" (U24) or similar, approved geotextile will be acceptable.

PSDB5 Construction

PSDB5-1 Unstable trench bottom

The Engineer may, upon consideration of the condition of the trench bottom, particularly with regard to the properties of the soil materials, order the use of a crushed stone layer in order to provide a stable platform for placing of the pipe bedding and laying the pipe in certain section of the trenches. The stone layer shall consist of 19 mm single-sized crushed stone, and shall have a specified thickness of 150 mm over the specified minimum base width.

Should the material in the trench bottom or the bedding material be of such a nature that it can penetrate the stone layer, the Engineer may instruct the Contractor to enclose the stone layer completely within a geotextile filter blanket which shall comply with the requirements of PSDB3-3, and shall have overlaps of at least 200 mm.

The Contractor will be paid for this item only if the Engineer has provided a written instruction to this effect. This instruction will only be given if the Engineer deems a layer necessary in order to stabilize the waterlogged floor of the trench bottom due to soil conditions, and to aid the Contractor in the handling of ground or surface water which will remain the responsibility of the Contractor.

PSDB5-2 Areas subject to traffic loads (Sub clause 3,5(b) and 5.7.2)

All trenches within the road reserves will be considered to be subject to traffic loads and the backfill material and compaction in these trenches shall comply with the requirements of Sub clause 3.5(b) and 5.7.2.

Only the portions of pipe trenches or open storm water channel under the surface of the road plus 1.0m on either side of the surface will be considered to be subject to traffic loads and the backfill material and compaction in these trenches shall comply with the requirements of Sub clause 3.5 (b) and 5.7.2.

PSDB5-3 Maximum length of open trench excavation

The total length of trenches open in a road reserve at any one time shall not exceed 200m per pipe-laying team.

PSDB5-4 Depositing material excavated from trench

Unless otherwise ordered by the Engineer, all excavated material shall be kept within the pipe servitude and shall be so deposited as not to interfere with or endanger the Works (for example, by causing the sides of the excavation to collapse), other property or traffic. The toe of the bank of excavated material shall be trimmed well back from the edge of the trench so as to leave a minimum 0.6 m clearance between the toe of the bank and the edge of the trench. The Contractor shall keep this strip clear of excavated material at all times.

The Engineer may, in terms of Sub clause 5.6.3 and 5.6.4, order the Contractor to remove any material which he considers liable to endanger or interfere with the Works, private property, traffic, or pedestrians, and to place such material at some other approved position. If the necessity for such removal is, in the opinion of the Engineer, a result of some default on the part of the Contractor, the cost thereof shall be borne by the Contractor, otherwise the cost will be borne by the Employer at a sum pre-agreed with the Engineer or measured as dayworks.

The Contractor shall take steps to avoid burying or contaminating topsoil which shall be set aside for replacing, as far as practical, on the surface from which it was excavated.

PSDB5-5 Excavation near structures or services

If the lack of space near existing houses, structures, fences or services restrict the use of normal excavation plant, or where trench excavations in hardrock material cannot be done by means of blasting, the excavation shall be carried out by other methods.

PSDB5-6 Excavation within erven

Excavation machinery will be permitted for the excavation of "hard rock" but only provided that no damage to property is caused as a result of the use of such machinery. (See PS7-6).

PSDB5-7 Hand excavation

Where steep slopes (steeper than 1:4), the lack of unobstructed space or the proximity of existing services prohibits the use of a 55 kW back-acting excavator for trench excavation, the Engineer may order or permit the use of hand excavation.

PSDB7 Testing

PSDB7-1 Testing the compaction of backfill to trenches and reinstatement of surfaces (Subclause 7.1)

The Contractor shall carry out density tests as specified in TMH1, in the positions indicated by the Engineer, to determine the compaction of the backfill material in the trenches and the

material used for reinstating the road construction layers. No single test result which is below the specified density, will be accepted.

In the case of trenches in areas subject to traffic loads, the Contractor shall, notwithstanding the terms of the second sentence of Subclause 7.1, bear the cost of all density tests carried out except as follows:

a) Where the test results are equal to or exceed the specified density, the Employer will bear the cost of that number of those tests ordered by the Engineer in excess of one test per 20 m3 of compacted material, based on the total volume of backfill and reinstated road layers, including the replacement of any over excavation, in areas subject to traffic loads.

b) The Contractor shall also bear the cost of those density tests, carried out by the Engineer, of which the test results are below the specified density.

PSDB8 Measurement and payment

PSDB8-3 Existing services that intersect or adjoin a pipe trench (Sub clause 8.3.5)

See PSA8-8, PSA8-9 and PSA8-10

PSG CONCRETE (STRUCTURAL) (SANS 1200 G)

PSG2 Interpretations

PSG2-1 Definitions (Sub clause 2.3)

Under (a) add:

"Constructional joint: a joint required on account of constraints or convenience in the method of construction and that is not a movement, contraction or expansion joint."

PSG2-2 Exposure condition (Sub clause 2.4.1)

All concrete on the Works shall be as specified for very severe exposure condition.

PSG2-3 Strength concrete (Subclause 2.4.2)

Grade 30 MPa/40 mm means strength concrete grade 30 MPa with 40 mm stone.

PSG2-4 Joints

Notwithstanding Subclause 2.4.3, "designated joints" will only be joints that are shown on the drawings. Any other joints that are required by the Contractor as a result of his construction constraints or for any other reason, whether approved by the Engineer or not, will not be considered to be designated joints as defined in Sub clause 2.4.3, i.e. they will be considered to be "non-designated" joints.

PSG3 Materials

PSG3-1 Cement (Sub clause 3.2)

All cement used in the works shall be ordinary portland cement complying with SANS 471.

PSG3-2 Storage (Sub clause 3.2.3)

Cement shall be used in the order in which it is received.

Unless approved by the Engineer, cement kept in storage for longer than 8 weeks shall not be used in the Works. All cement that contains lumps that cannot easily be crumbled to powder between the fingers, may not be used.

PSG3-3 Water (Sub clause 3.3)

Only portable water from an approved source may be used for mixing concrete. Water from a river or stream may however be used for curing.

PSG3-4 Aggregate (Sub clause 3.4)

The nominal stone size specified in the concrete grade (e.g. 30 MPa/40 mm) shall mean stone conforming to the grading specified in SANS 1083 for the nearest equivalent size, i.e. 40 mm means stone that complies with SANS 1083 for 37,5 mm size.

PSG3-5 Aggregates for grouting (Sub clause 3.4.1)

Notwithstanding the requirements of Sub clause 3.4.1, the grading of the fine aggregate (sand) and coarse aggregate (stone or pea gravel) to be used for grouting shall conform to the gradings given in Tables 1 and 2 respectively, as specified in SANS 1083:

PSG3-6 Samples (Sub clause 3.4)

At least one month before commencement of concrete work the Contractor shall supply at his own cost representative samples to the Engineer of the aggregates he intends using, together with certificates from an approved laboratory indicating that the aggregates comply with the specification. Approximately 50 kg of each sample of aggregate shall be supplied.

After approval these samples shall be taken as standard for the agreed aggregates to be used in the Works. If at any time during the course of the Contract the Engineer considers that there has been any deviation from the approved standard the Contractor shall submit further tested samples of material to the Engineer for approval.

PSG3-7 Use of plums (Sub clause 3.4.2)

The use of plums will not be permitted.

PSG4 Plant

PSG4-1 Mixing plant and vibrators (Sub clause 4.3 and 4.4)

Stand-by mixers and vibrators of adequate capacity and with an independent power source shall be maintained on site for immediate use in the event of breakdown of the regular mixers or vibrators or failure of the power supply.

PSG4-2 Formwork: chamfers and fillets

All internal and all exposed external angles in concrete work shall have 20 mm x 20 mm fillets and chamfers respectively unless otherwise specified or ordered. The top edge of a slab that is to receive an applied finish shall not be chamfered.

PSG4-3 Water-bath

A temperature-controlled water-bath with a capacity to cure two hundred cubes shall be provided on site. The water-bath shall be located under cover.

PSG4-4 Formwork ties

The use of either sleeves for formwork ties through the walls of water-retaining structures or cast-in ties is acceptable. Ties when cast in, shall have some form of positive anchorage to prevent any rotation when loosening formwork. The Contractor shall inform the Engineer as to which system he proposes using.

PSG5 Construction

PSG5-1 Reinforcement

PSG5-1.1 Fixing (Sub clause 5.1.2)

Fixing of reinforcing bars by welding and heating of bars will not be permitted.

PSG5-1.2 Spacers

Spacers of approved design include approved plastic or other proprietary spacers, or purpose made pre-cast mortar blocks.

Where mortar blocks are used they shall be properly shaped so as not to slip out of position and shall be made of the same mix as the mortar of the concrete in which they are to be placed. The mortar shall be well compacted by approved means into the moulds to result in blocks with a density of at least 2 300 kg/m3 and which are free from honeycombing. The mortar blocks shall be cured in water for at least 7 days. Blocks which have not been manufactured and cured strictly in accordance with these requirements or which are in any other way considered unsatisfactory by the Engineer, will be rejected and shall be removed from the Site.

PSG5-1.3 Cover (Sub clause 5.1.3)

In Sub clause 5.1.3(a) amend the words

"... or stirrup" to read:

"bar, secondary reinforcement, tie, stirrup, tying-wire knots or wire ends".

Add to Subclause 5.1.3:

"Tying wire may not encroach on the specified minimum cover by more than a single strand thickness."

PSG5-2 Formwork

PSG5-2.1 Classification of finishes (Sub clause 5.2.1)

Formwork for formed concrete surfaces against which backfill will be placed shall be rough. Formwork for all other formed surfaces shall be smooth, except where otherwise specified.

PSG5-2.2 Extra smooth finish

All concrete surfaces to the reactor, inlet works, etc. that will be exposed above the final ground levels shall have a special smooth finish to a Degree of Accuracy I. The formwork used shall be high-grade, unblemished and regular in size. Formwork ties shall be placed in a regular pattern. The special smooth finish shall be an off-shutter finish to the concrete such that no after treatment is required other than at the positions of formwork ties.

PSG5-3 Concrete

PSG5-3.1 General (Sub clause 5.5.1.1)

The concrete mix for strength concrete must be prepared in an approved laboratory and the results of actual test mixes must be submitted for approval together with 7-day and 28-day strength test results. Special attention is drawn to the fact that the concrete mix must provide a very dense and impervious concrete.

No concrete shall be cast until the mix designs have been approved by the Engineer. The Engineer may call for revised mix designs at any stage during the Contract.

PSG5-3.2 Chloride content (Sub clause 5.5.1.4)

With reference to Table 4, efflorescence will not be acceptable on any exposed concrete surface.

PSG5-1 Prescribed mix concrete (Sub clause 5.4.1.4)

PSG5-3.3 Prescribed mix concrete (Sub clause 5.5.1.6)

Notwithstanding the requirements of Sub clause 5.5.1.6, samples of aggregates will not be made available by the Engineer. The Contractor shall supply aggregates from commercial sources located by him, complying with the requirements of Sub clause 3.4.1, for the production of prescribed mix concrete.

Unless otherwise directed by the Engineer in writing, prescribed mix concrete shall be mixed in the following proportions:

	By mass			By volume		
Grade	**Cement**	**Sand**	**Stone**	**Cement**	**Sand+**	**Stone**
30	1	95 kg	150 kg	1 sk	0.080 m^3	0.11 m^3
25	1	115 kg	170 kg	1 sk	0,095 m^3	0,125 m^3
20	1	135 kg	190 kg	1 sk	0,11 m^3	0,14 m^3
15	1	155 kg	215 kg	1 sk	0,13 m^3	0,16 m^3
10	1	190 kg	250 kg	1 sk	0,155 m^3	0,185 m^3

+ Assuming 5% moisture in sand
sk = 50 kg sack

PSG5-3.4 Strength concrete (Sub clause 5.5.1.7)

With the exception of mixes weaker than 15 MPa, all concrete for structural units, the Works shall be considered to be strength concrete in terms of Subclause 5.5.1.7.

PSG5-3.5 Batching (Sub clause 5.5.2)

Batching of strength concrete shall be by mass. Prescribed concrete may be batched by volume.

PSG5-3.6 Casting of concrete in excavation (Sub clause 5.5.5)

Structural concrete shall not be cast directly against the side of any excavation without the use of formwork unless prior approval has been obtained in writing from the Engineer.

PSG5-4 Construction joints (Sub clause 5.5.7)

PSG5-4.1 General

The edge of joints, exposed to view in the finished structure, shall be formed with suitable beads to provide a straight edge true to line and level.

As soon as practical, but not before 15 hours after placing, the construction joint surface shall be prepared to receive fresh concrete. This preparation, as specified in 5.5.7.3(a) to (d), shall be such as to remove all laitance or inert and strengthless material which may have formed and the specified chipping or sand blasting shall be such as to produce a roughened surface all over.

When concreting is interrupted concrete surfaces shall be protected from the sun as specified in Sub clause 5.5.8(d) or by means of hessian kept damp until concreting is resumed.

PSG5-4.2 Formed joints (generally vertical or near vertical)

Formed joints will be considered to be designated joints as defined in Sub clause 2.4.3. (The forming of a straight edge to a joint as specified in PSG5-4.1 does not constitute a formed joint).

Each joint shall be formed as shown on the drawings, complete with shear key rebates, waffle formwork, V-feature, water stops, "Flexcell" or similar joint filler, dower bars and their PVC tubes, etc. as indicated.

PSG5-4.3 Joints between floors and walls and pillars

Construction joints between foundations or footings and walls, or piers standing on them, shall not be made flush with the supporting surface, but shall be made at a distance above the floor or footing shown on the drawings or approved by the Engineer. The "kicker" (starter stub) shall be cast as an integral part of the bottom, floor or footing.

PSG5-5 Items to be cast in or grouted in to concrete

PSG5-5.1 Fixings for equipment supplied under separate contract

The Contractor shall form the pockets and grout in the holding down bolts for equipment supplied under a separate contract. Holding down bolts will be supplied by others, but shall be positioned in the pockets by the Contractor, using templates or dimensions supplied by others.

PSG5-6 Concrete surfaces (Sub clause 5.5.10)

PSG5-6.1 Screeded finish

After placing and compacting, the concrete on a top (unformed) surface shall be struck off with a template to the designated grades and tamped with a tamping board to compact the surface thoroughly and to bring mortar to the surface, leaving the surface slightly ridged but generally at the required elevation. No mortar shall be added, and noticeable surface irregularities caused by the displacement of coarse aggregate shall be made good by re-screeding after the interfering aggregate has been removed or tamped.

PSG5-6.2 Wood-floated finish (Sub clause 5.5.10.1)

Where wood-floating is ordered or scheduled, the surface shall first be given a finish as specified in PSG5-6.1 and, after the concrete has hardened sufficiently, it shall be wood-floated, either by hand or machine, only sufficiently to produce a uniform surface free from screeding marks.

PSG5-6.3 Steel-floated finish

Where steel-floating is specified or scheduled, the surface shall be treated as specified in PSG5-6.1 except that , when the moisture film disappeared and the concrete has hardened sufficiently to prevent laitance from being worked to the surface, the screeded surface shall be steel-trowelled under firm pressure to produce a dense, smooth, uniform surface free from trowel marks.

PSG6 Tolerances

PSG6-1 General

All work shall be to Degree of Accuracy I.

PSG7 Testing

PSG7-1 Frequency of sampling (Sub clause 7.1.2)

One sample shall consist of three concrete test cubes. For each sample taken the position in the structure shall be recorded where the batch represented by the sample is placed.

Sampling of concrete of a particular grade shall be as specified in Sub clause 7.1.2 with the following frequency of sampling referred to in Sub clause 7.1.2.2 being amended to read as follows:

"A minimum of 4 samples per day of each grade of concrete or 6 samples for pours in excess of 10 m3 shall be taken."

PSG7-2 Grouting

The Contractor shall, where so ordered, carry out a site test for each grouting procedure and each grouting gang to be used. The tests shall be carried out on a dummy bedplate similar in configuration to that which is to be grouted, but not exceeding 1 m2 in area unless otherwise ordered. When the dummy bedplate is dismantled, the underside shall show a minimum grout contact area of 80% with reasonably even distribution of the grout over the surface grouted except that, in the case of expanding grout, the minimum grout contact area shall be 95%. The

test shall show evidence of good workmanship and materials and the results shall be to the satisfaction of the Engineer.

The Contractor shall, when so ordered, make standard test cubes from various grout mixtures and also subject them to compression tests to determine whether the specified strength has been achieved. Test procedures shall comply with the relevant requirements of Sub clause 7.2.1 to 7.2.3.

PSG7-3Water tightness test

The water tightness of the pump sump shall be tested as follows:

The structure shall be filled with clean water and shall be allowed to remain filled for a period of seven days during which time any loss of water which may occur shall be made up by filling the structure to top water level. At the beginning of the test, the water level shall be recorded and the structure shall be left undisturbed for a period of not less than seven days. The structure shall be considered watertight if the drop in level, excluding losses due to evaporation, does not exceed 10 mm in 7 days and no leakage or dampness is apparent.

In the event of appreciable leakage being evident at any stage of the filling or testing or in the event of the Engineer considering the final degree of water tightness to be unsatisfactory, the Contractor when ordered by the Engineer shall discontinue such filling or testing and shall, at his own expense, take approved steps immediately to rectify the leakage and to make the work thoroughly sound to the complete satisfaction of the Engineer. All such work of rectification shall be continued assiduously until a satisfactory test is obtained, which shall prove to the Engineer that a sufficient degree of water tightness has been obtained.

If required by the Engineer, the structure shall be retested before the expiry of the Defects Liability Period.

The Works will not be certified complete until the structure has been proved by testing to be watertight to the satisfaction of the Engineer.

PSGA CONCRETE (SMALL WORKS) (SABS 1200 GA)

There are no variation to Clauses 1, 2, 4, 5, 7 and 8.

PSGA3 Materials

PSGA3-1 Cement (Sub clause 3.2)

All cement used in the works shall be ordinary portland cement CEM 1 of strength class 42.5 complying with SABS ENV197-1.

PSGA3-2 Dolomitic aggregates (Sub clause 3.4)

All course and fine aggregate used in pre-cast or in-situ concrete, mortar or plaster for the construction of chambers, benching in the jacked pipes, and other structures shall be dolomitic.

When tested in accordance with the method specified in Appendix C of SABS 677, not more than 25% by mass of the dolomitic aggregate shall be insoluble in hydrochloric acid.

At least one month before commencement of concrete work the Contractor shall supply at his own cost representative samples to the Engineer of the aggregates he intends using, together with certificates from an approved laboratory indicating that the aggregates comply with the specification. Approximately 50kg of each sample of aggregate shall be supplied.

After approval these samples shall be taken as standard for the agreed aggregates to be used in the Works. If at any time during the course of the Contract the Engineer considers that there has been any deviation from the approved standard the Contractor shall submit further tested samples of material to the Engineer for approval.

PSGA6 Tolerances

PSGA6-1 General (Sub clause 6.1.1)

The permissible deviations shall be within the limits set out for Degree of Accuracy II in Subclause 6.4.

PSGA8 Measurement and payment

PSGA8-1 Prescribed mix concrete (Sub clause 8.4.1)

Notwithstanding Sub clause 8.4.1, the rates for prescribed mix concrete shall cover the cost of concrete mixed in the following:

	By mass			By volume		
Grade	**Cement**	**Sand**	**Stone**	**Cement**	**Sand+**	**Stone**
25	1	115 kg	170 kg	1 sk	0,11 m^3	0,14 m^3
20	1	135 kg	190 kg	1 sk	0,11 m^3	0,14 m^3
15	1	155 kg	215 kg	1 sk	0,13 m^3	0,16 m^3
10	1	190 kg	250 kg	1 sk	0,16 m^3	0,19 m^3

+ Assuming 5% moisture in sand
sk = 50 kg sack

PSL MEDIUM-PRESSURE PIPELINES

PSL 3 MATERIALS

PSL 3.4 Steel pipes, fittings and specials

PSL 3.4.1 General

- **Add the following:**

  Before leaving the manufacturer's workshops the pipes and fittings shall be tested in accordance with SABS 719, and the test certificates shall be submitted to the Engineer.

PSL 3.4.3 Pipes of nominal bore over 150 mm

Steel pipes shall be manufactured of Grade A steel in accordance with SABS 719.

Pipes with diameter exceeding 600 mm shall be plain ended and joined through on-site welding.

Pipes with diameters smaller than 600 mm and larger than 150 mm shall be bell and spigot jointed as shown on the drawings.

PSL 3.8 Jointing Materials

PSL 3.8.2 Flexible couplings

PSL 3.8.2.1 All flexible couplings shall be “Klamflex” or “Viking Johnson” couplings without centre register, or approved similar.

Rubber rings shall be of the wedge-type and shall be manufactured from natural or synthetic rubber only. Rubber rings manufactured from reclaimed rubber will not be acceptable.

PSL 3.8.3 Flanges and accessories

All flanges, not jointing to existing flanges, shall be in accordance with SABS 1123, Table 1600/3. The type, drilling pattern and sizes of flanges jointing to existing flanges or special valves shall match those of the existing flanges and valves and shall be determined on Site.

PSL 3.9 Corrosion Protection

PSL 3.9.2 Steel pipes

PSL 3.9.2.4 External and internal protection (Additional clause)

All steel pipes and specials of diameter greater than 150 mm shall be internally protected with a workshop applied cement mortar lining and externally coated with glass fibre reinforced bitumen all as specified in DWS 1131: Lining and Coatings.

All steel pipes and specials of nominal diameter smaller or equal to 150 mm shall be galvanized as specified in SABS 62.

PSL 3.9.5 Joints, Bolts, Nuts and Washers

All nuts, bolts and washers shall be cadmium-coated and shall comply with SABS 135.

PSL 3.9.6 Corrosive soil

Where specified by the Engineer steel pipes, pipe fittings and steel flanges in contact with soil shall over and above the protection described above be protected as specified in Clause 3.9.6 with “DENSO” retrolatum tape or approved similar. Application shall be strictly in accordance with the manufacturer’s requirments. A polyethylene tape of 300 microns minimum shall then be spirally wrapped over the petrolatum tape and fixed to the clean pipe ends with pressure sensitive tape.

PSL 3.9.7 Painting of pipes and fittings (Additional clause)

In addition to the corrosion protection as specified above, the pipes in valve chambers shall be painted with two layers of gloss enamel in colours to be specified by the Engineer.

Steel specials up to and including 150 mm diameter shall be hot-dip galvanised.

PSL 3.10 Valves

Valves shall comply with Particular Specification PDE.

PSL 5 CONSTRUCTION

PSL 5-1 Laying

PSL 5.1.3 Keeping Pipelines Clean

The interior surfaces of all pipes, specials, valves and fittings shall at all times be kept free from dust, silt, foreign matter. Access by rodents, animals and birds shall be prevented. Pipes and specials shall not be used as shelters by staff or for the storage of garments, tools, materials, food containers or similar goods.

Metal night-caps approved by the Engineer shall be used to close off all ends of each laid section of pipeline when work is stopped at the end of the day or for longer periods and shall be left on the ends of sections of completed pipe work until such sections are tied-in with the remainder of the completed pipeline.

Notwithstanding the use of nigh-caps the Contractor shall at his own expense make good all damage to pipe linings and fittings caused by the ingress of dirty water, silt, sand, debris, vermin, insects and other foreign matter. The Contractor shall at his own expense and to the satisfaction of the Engineer clean the interior of the pipeline of such contaminants, failing which the Engineer may order the Contractor to remove the pipes from the trench and replace them with clean pipes.

PSL 5.1.5 Locating of existing pipes (Additional clause)

The Engineer will indicate the approximate positions of existing pipes on site where new pipelines are to be joined with existing pipelines, or where new pipelines may cross existing pipelines or services. At the indicated positions a trench shall be excavated to locate the existing pipe or service. Payment for locating existing pipes and services will be made under Section 1200 A.

After the pipeline has been exposed it will be regarded as a known service.

PSL 5.2 Jointing Methods

PSL 5.2.2 Flanges (Steel pipelines)

All flanges shall be installed with bolt holes off-centre and symmetrically off-set from the vertical centre line of the flange. Flanges shall be installed truly square to the axis of the pipe.

The Contractor shall ensure that the correct jointing materials, i.e. gaskets, bolts and nuts are available when required. Only correct diameters and lengths of bolts and studs shall be used. Flat washers shall be used under all nuts. The length of bolts and studs shall be such that at least two threads protrude from the nut when fully tightened. The threads of bolts, studs and nuts shall be thoroughly cleaned and then coated with a graphite/grease compound immediately prior to assembly.

Flanged fittings shall be so installed that there are no stresses induced into the pipe work, specials or fittings by forcing ill-fitting units into position or by bolting up flanges with faces not uniformly in contact with their gaskets over their whole faces.

PSL 7 TESTING

PSL 7.3 Standard Hydraulic Pipe Test

PSL 7.3.1 Test pressure and time of test

The hydraulic tests shall be carried out within 7 to 14 days after the last anchor block in the section to be tested has been cast. The field test pressure shall be 1,5 times the working pressure of the pipes in the section to be tested. The pressure is applicable to the lowest point of the section to be tested.

PSL 8 MEASUREMENT AND PAYMENT

PSL 8.2.18 Valve/pipe chamber complete as shown on the drawings ..... Unit No

Each type of chamber shall be described and measured separately. The unit of measurement shall be the number of completed chambers as shown on the drawings.

The tendered rates shall cover the cost of supplying all materials, tools and labour for the construction of the chamber complete as shown on the drawings, including excavation, backfill, brickwork, reinforced and mass concrete work, air bricks, manhole cover and frame, step irons, drainage sump, pipe plinths, the building in of pipe specials etc. and all other costs involved in providing a complete well-finished chamber.

PSLB BEDDING (PIPES) (SABS 1200 LB)

PSLB3 Materials

PSLB3-1 Selected granular material (Sub clause 3.1

Substitute LB3-1 with the following:
In the case of flexible pipes the selected granular material shall be an aggregate, sand or granular material, all of a non-cohesive nature and free from any organic material, of which the grading analysis shows 100% passing through a 13.2 mm sieve and not more than 5% passing through a 0.075 mm sieve.

PSLB3-2 Selected fill material (Sub clause 3.2)

Substitute LB3-2 with the following:

The requirements of PSLB3-1 shall apply mutates mutandis.

PSLB3-3 Bedding (Sub clause 3.3)

Add the following to LB3-3:

All pipes shall be classified as flexible pipes and shall be laid on a Class B bedding.

PSLB5 Construction

PSLB5-1 Class of bedding

uPVC and HDPE pipes shall be bedded on Class B bedding as specified for flexible pipes on the drawings.

PSLB5-1.1 Water pipes

Water pipes shall be bedded as specified for flexible pipes with Class B bedding unless otherwise indicated on the drawings or ordered by the Engineer.

PSLB8 Measurement and payment

PSLB8-1 Volume of bedding material (Sub clause 8.1.3)

The volume of bedding material will be measured net, excluding the volume occupied by the pipe.

PSLB8-2 Employer's borrow area

See PS5-4.

8 MEASUREMENT AND PAYMENT

The lining and coating of straight pipes shall be measured per linear metre of pipe lined and coated.

The lining and coating of specials, whether lined by hand or otherwise, shall be measured per unit of complete specials, except where such specials are lined and coated in a single in-situ operation by mechanical means, when the lining and coating of same shall be included in measured per linear metre of complete pipeline lined or coated.

Payment for factory applied linings and coatings shall be included in the payment for pipes delivered to site.

Payment for in situ applied linings and coatings shall be for completed linings and coatings at the rates scheduled.

PDE VALVES

PDE 1 SCOPE

This section covers gate, air, reflux, butterfly and level control valves, and hydrants for use in medium-pressure pipelines.

PDE 2 INTERPRETATION

PDE 2-1 References

The interpretation clause of SABS 1200 L: Medium-Pressure Pipelines and the interpretation clauses in the applicable SABS standards listed below, as well as the equivalent ISO standards in the case of brand names specified shall apply:

SABS 144 Cast iron single-door reflux valves
SABS 192 Cast steel single-door reflux valves
SABS 200 Copper alloy ingols and casting
SABS 664 Cast iron gate valves for water works
SABS 1123 Steel pipe flanges
SABS 1128 Fire fighting equipment, Part I: Components of underground and aboveground hydrant systems.

PDE 2-2 Application

This particular specification contains clauses that are generally applicable to contracts for the supply and installation of valves. Variations and additions to this particular specification are set out in this Project Specification.

PDE 3 MATERIALS

PDE 3-1 General

Valves shall be capable of withstanding the applicable test pressures specified in Clause PDE-7. All valves shall be supplied complete with couplings and jointing material.

Unless otherwise stated all valves shall be supplied with operating caps.

Satisfactory temporary end covers shall be provided to protect threads, flanges and prepared ends of valves from damage during transportation and handling on Site.

Valves shall be so transported, stored and handled as to prevent damage. Valves damaged in any way shall be removed from the Site.

PDE 3-2 Durability of valves

The valves shall be suitable for the specific application in the area where they are to be used and all materials utilized in the construction of the valves shall be resistant to corrosivity of the operating environment.

PDE 3-3 Gate-valves

PDE 3-3-1 General

All gate-valves shall comply with the requirements of SABS 664 and shall carry the SABS mark.

The valves shall be cast-iron fitted with non-rising spindles and the ends shall be double-flanged or double-spigotted as stated in the Schedule of Quantities.

PDE 3-3-2 Direction of Rotation

The direction of spindle rotation for valve closing shall be clockwise unless otherwise specified in the Project Specification and the Schedule of Quantities. The closing and/or opening direction shall be clearly marked on the valve.

PDE 3-3-3 Class of Valves

The class of valves and maximum working pressure shall be Class 10 (maximum working pressure of 1000 kPa) or Class 16 (mwp of 1600 kPa), Class 2500 kPa) or Class 40 (mwp of 4000 kPa), whichever is specified in the Schedule of Quantities.

Gate-valves shall be capable of being opened and closed by hand under an unbalanced pressure equal to the maximum working pressure of the class of valve specified.

PDE 3-3-4 Valve Trim

Gate-valves shall be of the resilient seal type with the gate seal constructed of neoprene. The spindle shall be stainless steel, and the body spheroidal graphite iron with machined faces.

PDE 3-3-5 Guides and Seals

The sealing and gate guide areas shall be designed to eliminate deposits in the valve body.

The valve shall be provided with a lock-seal permitting the replacement of spindle seals under pressure.
The spindle seal shall consist of at least two O-rings located in a corrosion-resistant housing. A wiper-ring to prevent ingress of dirt shall be provided.

The gate guides shall be of substantial design to support the gate until the point closure.

The valves shall be drip-tight from zero to maximum working pressure under test and field conditions.

PDE 3-3-6 Auxiliary Fittings

Valves of 300 mm diameter and larger shall be fitted with the following auxiliary fittings:

(i) Drain Plugs

300 mm diameter valves and larger shall be supplied with gunmetal drain-plugs screwed into the lowest point of the valve and the valve body shall be suitably drilled and tapped to accept to drain-plug. The plug must be in position when the test pressure is position when the test pressure is applied.

(ii) Ball Bearing Thrust Collars

300 mm diameter valves and larger shall be fitted with ball-races on the top and bottom of the thrust collars. The ball-races shall be totally enclosed in a grease-packed cover, which shall be sealed to prevent the egress of grease. Provision must be made for lubricating the ball-races and the lubrication arrangement shall allow for regressing while the valve is under pressure.

PDE 3-3-7 Flange Drillings

Flanges shall be drilled an d bolted in accordance with the requirements of tables 1000/3, 2500/3 and 4000/3 of SABS 1123.

PDE 3-4 Air Valves

PDE 3-4-1 General

Air valves shall be cast-iron bodied of either the single or double-orifice ball-type, or Vent-O-Mat or approved similar if so specified in the Project Specification or the Schedule of Quantities.

The design of the valve shall be such as to preclude the loss of water or the possibility of the ball being blown shut by the passage of air when the accumulation of air in the pipeline is being released.
The valves shall also be positive in action to admit a free and full supply of air when the pipeline is being emptied or when operating conditions demand.

In the case of double air valves, the small orifice shall provide specifically for the automatic release of air accumulating under working conditions whilst the large orifice shall automatically discharge air during filling of the pipeline and completely ventilate during emptying.

PDE 3-4-2 Working Pressure

The working pressure rating of the air valves shall be to suit the application or as stated in the Schedule of Quantities.

PDE 3-4-3 Isolating Valves

Air valves shall be provided and supplied complete with isolating valves entirely reliable in operation for the shutting down of the air valve for its complete inspection and removal and replacement of the balls or other parts as required.

(i) In the case of double-orifice air valves, the isolating valve shall be separate and shall be incorporated on the inlet stem to the valve. The isolating spindle shall be provided with a spindle cap.

(ii) In the case of single-orifice air valves, the isolating valve shall be of gun-metal and shall be incorporated on the inlet stem to the valve.

(iii) The direction of rotation of the isolating valve shall be clockwise closing, unless otherwise specified in the Project Specification or the Schedule of Quantities.

PDE 3-4-4 Outlet Orifieces

The outlet orifices of air valves shall be fitted with gun-metal bushes.

PDE 3-4-5 Balls

The design of the balls and the materials used in their manufacture shall be such as to be completely corrosion-resistant, and that they will suffer no distortion at the specified test pressure.

PDE 3-4-6 Flanges

Flanges shall conform to the dimensions and drilled in accordance with table 1000/3, 1600/3, 2500/3 or 4000/3, whichever is specified, of SABS 1123 to suit working pressures.

PDE 3-5 Reflux valves

PDE 3-5-1 General

Reflux valves shall be flange-ended and shall comply with the requirements of SABS 144, Cast Iron Single-Door Reflux Valves or SABS 192 Cast Steel Single-Door Reflux Valves as applicable and shall bear the SABS mark.

Reflux valves installed in pumping stations and pumping mains, suction or delivery, shall be fitted with external levers and counterweights.

PDE 3-5-2 Class of Valve and Body

The working pressure and class of valve shall be as specified in the Schedule of Quantities and the body construction shall be in accordance with Table PDE-1.

TABLE PDE-1 REFLUX VALVE CLASS AND WORKING PRESSURE

CLASS	MAXIMUM WORKING PRESSURE	BODY CONSTRUCTION
10	1000 kPa	Cast iron
16	1600 kPa	Cast iron
25	2500 kPa	Cast steel
40	4000 kPa	Cast steel
100	10000 kPa	Cast steel

PDE 3-5-3 Flange Drillings

Flanges shall be drilled and bolted in accordance with the requirements of table 1000/3, 1600/3, 2500/3 or 4000/3 of SABS 1123 as applicable. Precision bolts and nuts are not required.

PDE 3-5-4 Valve Trim

The trim of reflux valves shall be as follows:

(i) Cast Iron Reflux Valves shall have stainless steel trim;

(ii) Cast Steel Reflux Valves shall have stainless steel seats and stainless steel hinge pins.

PDE-3.6 Butterfly valves

PDE-3.6.1 General

Butterfly valves smaller than 200 mm dia shall be of the lugged or wafer type. Butterfly valves of 200 m diameter and over shall in addition be double-flanged and shall be fitted with gearboxes and handwheels unless otherwise stated.

PDE-3.6.2 Opening and Closing

The direction of spindle rotation of valve closing shall be clockwise, unless otherwise stated in the Schedule of Quantiites.

All valves shall be capable of being opened or closed by hand an unbalanced pressure equal to the design pressure without any difficulty. The disc shall close with a positive action with no possiblitly of slamming shut during any stage of the closing operation and the valve shall be capable of operating at any opening without variation of disc position or flutter of the disc.

PDE-3.6.3 Class of Valve

The class of valve shall be as stated in the Schedule of Quantities and shall be Class 10 (maximum working pressure of 1000 kPa) or Class 16 (maximum working pressure of 1600 kPa).

PDE-3.6.4 Valve body

The valve body shall have integral hubs for housing shaft bearings and seals.

The valve body shall have integral disc overtravel stops to prevent the disc from rotating in the wrong direction and to protect the seat from damage if actuators are incorrectly adjusted.

PDE-3.6.5 Discs

Valves of Class 16 (1600 kPa) and greater shall have offset and eccentric discs to provide uninterrupted 360 seating and to prevent the disc edge from rubbing against the seat in the top and bottom of the shaft areas.

The disc shall be a single casting having a streamlined shape with smooth continuous surfaces so that good hydraulic stability is assured even in turbulent flows.

PDE-3.6.6 Seals and seats

Seals shall be of the resilient type with non-weathering, non-sticking, long life properties. The profiles of the seats shall be smooth and continuous and shall provide adequate “lead in” for the resilient seal during closure of the disc to prevent excessive seating torque requirement.

Resilient seals shall be fully locked-in, removable and replaceable. All securing elements shall be of stainless steel. Valve seats shall be readily removable and replaceable on site.

PDE-3.6.7 Shafts

The disc shafts or stub shafts shall be of high-strength stainless steel or equivalent and shall be attached to the valve disc by means of stainless steel securing elements. Shafts shall be continuous or may be of the stub-shaft type. In the case of the stub-shaft type, each stub shaft shall extend into the disc hub for a distance of at least 1,5 times the shaft diameter.

All keys, dowel pins and taper pins use dot attach the shaft to the disc shall be mechanically secured. The shaft shall be so sealed that the only two wetted parts shall be the disc and seat.

PDE-3.6.8 Bearings

Class 16 (1600kPa) valves or valves with diameter of 350mm or large shall be fitted with two-way adjustable thrust bearings in order to permit precise disc-to-seat positioning at all times.

Positive bearing retention shall also be provided so that the bearing will not shift under operating conditions.

The valve shall be capable of being installed and operated in any position.

The bearings shall be of the self-lubricated type.

PDE-3.6.9 Stuffing boxes

Stuffing box assemblies shall be such that the packing can be adjusted or replaced under pressure without removing the valve from the pipeline.

PDE-3.6.10 Actuators

Actuators shall be enclosed in weatherproof enclosures.

Actuators shall be self-locking and capable of holding the disc in any fixed position for any extended period of time.

Safety measures (such as shear pins) shall be built into the actuator in order to prevent damage to the valve if excessive force is applied to the hand wheel in the fully open or closed position.

All actuators shall be equipped with position indicators, adjustable travel stops and indications of the “open” and “closed” positions.

The gears shall be grease-lubricated with grease-nipples located on the outside of the enclosure.

PDE-3.6.11 Flange Drillings

Flanges shall be drilled and bolted in accordance with the requirements of table 1000/3 or 1600/3 of SABS 1123.

PDE-3.7 Level control valves

PDE-3.7.1 General

This specification is applicable to all altitude and float-actuated control valves. The valves shall be of the globe pattern, hydraulically operated by a pilot-controlled diaphragm which in turn operates a separate resilient sealing disc. Actuation shall be by remote pilot float valve.

PDE-3.7.2 Main Valve Design

The main valves shall have a single renewable seat on which the sealing disc operates.

If applicable to the valve design, the diaphragm assembly containing a valve stem shall be fully guided at both ends and shall be the only moving part of the valves. The two bushes (bearings) on the spindle which locate the diaphragm assembly shall be securely locked in position, and not simply pressed in.

No external packing glands shall be permitted.

All necessary repairs must be possible without removing the valves from the lines.

All outgoing and incoming pipes from and to the cover shall be provided with stop cocks so that the cover can be isolated from the rest of the system.

The valve shall be supplied complete with an opening and closing speed control to prevent the occurrence of any high pressure in the pipelines due to surge arising during opening and closing cycle of the valve.

PDE-3.7.3 Pilot Valves

(i) Float-actuated Control Valves.

The float mechanism shall be located remotely from the main valve inside the reservoir where a stilling well shall be provide around the float.

All pilot valves shall be protected by strainers incorporated within the valve.

Control of level differentials shall be achieved merely by setting stops on the float rod. A range of 1 meter shall be provided.

(ii) Altitude Valves

The piping for sensing the water level in the reservoir shall be as specified in the Project Specifications or/and shown on the Drawings. The valve installation includes all piping between the valve and the point of measurement as well as the installation of the valve and piping. The piping shall be adequately protected to prevent any damage.

All pilot valves shall be protected by strainers incorporated within the valve.

PDE-3.7.4 Valve Operation

The valve shall open fully when the water level reaches a predetermined low point and shut drip tight when a predetermined high point is reached.

The Contractor shall adjust the valve to open and close at the levels given on the drawings or/and specified in the Project Specification.

PDE-3.7.5 Materials of construction:

(i) Main valve:

Body	-	Close-grained cast-iron or epoxy-coated carbon steel
Main valve trim	-	Brass, bronze or epoxy- coated carbon steel
Pilot control	-	Bronze
Pilot control trim	-	Stainless steel 303
Orifice plate	-	Stainless steel 303 Diaphragm, seating
Rings or sleeves	-	Rubber

(ii) Float control:

Float	-	Non-corroding plastic or stainless steel.
Float linkage and float rod		
Base plate	-	Brass and P.V.C or stainless steel.

(iii) Connecting Pipes - Copper with brass fittings or stainless steel.

The above materials are specified for the valves and float control and tender or quotation prices shall be based thereon. Should the specified material s not be available, an alternative offer may be submitted for the use of other standard materials in which case full details of the deviation from the material specified shall be stated.

PDE-3.8 Hydrants

Hydrant valves and outlet connectors shall comply with the requirements of SABS 1128: Fire Fighting Equipment, Part I: Components of Underground and Above-ground Hydrant Systems. Any deviations or additions will be covered in the Project Specifications if applicable.

PDE-3.9 Finish

All cast-iron part, except flange faces shall be thoroughly cleaned an epoxy primer applied, followed by one or more coats of high-build epoxy material to give a total dry film thickness of at least 250 microns applied in conformity with the manufacture's recommendations. Coating system shall be as specified in the Project Specifications of the relevant Particular Specifications.

PDE-4 PLANT

In the assembly and coupling up of valves correct tools and spanners of the correct sizes designed for the function they are to fulfil shall be used. The indiscriminate use of pipe-wrenches will not be permitted and any fittings damaged by the sure of incorrect tools shall be removed from the Site.

PDE-5 CONSTRUCTION

The applicable clauses of SABS 1200 L: Medium-pressure Pipelines shall apply unless otherwise stated in the Project Specifications.

PDE-6 TOLERANCES

The dimensional tolerances specified in the applicable standard specifications shall apply.

PDE-7 TESTING

The testing of the various valves shall be in accordance with the relevant SABS specifications 144, 664 and 192.

Once installed in pipelines, the valves shall be subjected to the same hydraulic test and pressures specified for the field tests in SABS 1200L Clause.

PDE-8 MEASUREMENT AND PAYMENT

The applicable clauses of SABS 1200 L shall apply. The tendered rates shall include full compensation for the supply and installation of all valves as listed and described in the Schedule of Quantities, including the costs of all gaskets, bolts and nuts an sundries require complete with protective coat finishing as specified.

PART C: ENVIRONMENTAL MANAGEMENT SPECIFICATION

1 General

In order to ensure that the construction works is carried out in an environmentally sensitive matter, strict compliance to the Environmental Management Plan (EMP) guidelines is required. The purpose of the EMP is to:

- Encourage good management practices through planning and commitment to environmental issues,
- Provide rational and practical environmental guidelines to:
  i. Minimise disturbance of the natural environment,
  ii. Prevent pollution of land, air and water,
  iii. Prevent soil erosion and facilitate re-vegetation.
- Adopt the best practicable means available to prevent or minimise adverse environmental impact,
- Develop waste management practices based on prevention, minimisation, recycling, treatment or disposal of wastes,
- Train employees and contractors with regard to environmental obligations.

2 Training and Induction of Employees

- The Contractor has a responsibility to ensure that all those people involved in the project are aware of and familiar with the environmental requirements for the project (this includes sub-contractors, casual labour, etc.). The CMP shall be part of the terms of reference for all contractors, sub-contractors and suppliers.

3 Complaints Register and Environmental Incident Book

Any complaints received by the project team from the public will be recorded. The complaint should be brought to the attention of the site manager, who will respond.

The following information must be recorded:

- Time, date and nature of the complaint,
- Type of communication (telephone, letter etc),
- Name, contact address and telephone number of the complainant,
- Response and investigation undertaken and
- Actions taken and by whom.

All complaints received will be investigated and a response given to the complainant within 14 days.

All environmental incidents occurring on the site will be recorded. The following information will be provided:

- Time, date, location and nature of the incident,
- Actions taken and by whom.

4 Site Cleanliness and Neatness

- Location of a construction camp is to be approved by the Engineer and is to be restored to its previous condition after completion of construction.
- The construction camp should preferably be fenced with a 1.8m bonnox fence or similar approved.
- All materials, equipment, plant and vehicles must be stored within the construction camp.

- A dedicated area must be made available for construction staff to change and store their personal belongings.

5 Access

Access to existing roads, schools, buildings, shops and residential properties must not be impeded during construction.
Access roads utilised by the Contractor must be maintained in good condition.

6 Borrow Pits

- Mining authorisations (permits) for borrow pits must be obtained from the Department of Minerals and Energy (DME) in consultation with the Department of Water Affairs (DWA).
- Spoil dumps resulting from borrow pits must not interfere with any natural surface drainage.
- Borrow pits must be rehabilitated after use in accordance with the requirements of DME and DWA.

7 Dust Control / Air Quality

- Dust suppression measures must be implemented during construction by ensuring that all surfaces prone to dust generation are kept damp (e.g. use of water tanker).
- Ensure that vehicles and equipment are in good working conditions and that emissions are not excessive.
- Ensure that vehicles and equipment are in good working conditions and that emissions are not excessive.
- Special care must be taken in areas where the route passes close to schools and residential areas.
- The speed of construction vehicles must be reduced.

8 Fauna

- Contractor staff may not chase, catch or kill animals encountered during construction.

9 Fire Prevention and Control

- Smoking is prohibited in the vicinity of flammable substances.
- The contractor must ensure that fire-fighting equipment is available on site, particularly where flammable substances are being stored or used, and that construction staff are aware of where it is kept and how it is operated.
- Fires started for comfort (warmth) are prohibited, due to the risk of veld fires and risk to adjacent property owner's lands.

10 Grave Sites

- Gravesites in close proximity to the road must not be disturbed during construction.

11 Materials Handling and Spills Management

- Any hazardous materials to be used during construction (e.g. lime, fuel, paint, etc) are to be stored in a designated area at the campsite.
- The storage containers/facilities (including any diesel/petrol tanks) must be placed on an impermeable surface and surrounded by a bund wall, in order to ensure that accidental spillage does not pollute the environment.
- Workers must at all times be made aware of the health and safety risks associated with any hazardous substances used (e.g. smoking near fuel tanks), and must be provided with appropriate protective clothing/equipment in case of spillages or accidents.
- Ensure all staff and contractors undergo relevant training in the maintenance of equipment to prevent the accidental discharge or spill of fuel, oil, lubricants and other chemicals.
- Any spill of potentially hazardous materials must be cleaned up immediately (Potentially hazardous materials on site include paint, oil, grease, fuel, turpentine, etc).
- The area of contaminated soil or spill must be deposited into the hazardous waste container(s).
- The contractor should keep Peat Sorb or a similar absorbent on site to clean up any spills. The absorbent must be stored in a designated area and be available for inspection.
- All spills are to be recorded in the environmental incident book.

12 Noise

- Noise generating activities must be restricted to between 07h00 and 17h00 Monday to Friday, unless otherwise approved by the appropriate competent person in consultation with adjacent landowners/affected persons.
- All equipment, vehicles and machinery must be in good working condition and be equipped with sound mufflers if necessary.
- Construction staff must be trained and made aware of not creating unnecessary noise such as hooting and shouting.

13 Pollution Control

- Soil and water pollution through usage of fuel, oil, paint, bitumen or other hazardous substances must be avoided.
- All construction vehicles are to be maintained in good working order so as to prevent soil or water pollution from oil, fuel or other leaks, and to reduce noise pollution.

14 Rivers and Streams

- During construction of bridge structures, there must be no obstruction of the water flow of rivers and streams.
- Excavated material must not be stockpiled on or near riverbanks, in order to prevent sedimentation occurring.
- Erosion control measures must be employed both during and after construction.
- No impediments to natural surface water flow, other than approved erosion control measures, must occur.

15 Safety

- Safety measures, such as detour signs, must be implemented during construction to ensure the safety of workers, pedestrians and drivers/passengers in vehicles in the vicinity of construction work.
- Special care must be taken in the vicinity of schools to ensure the safety of children wishing to cross the road under construction.
- The relevant signage (e.g. speed control signs) must be erected alongside the road during the operation phase in order to control traffic.
- Accommodation must be made for pedestrian pathways alongside the road during the construction and operation phases.

16 Soil Management

- Stormwater drainage pipes must be installed alongside the road in all areas susceptible to soil erosion.
- Erosion should be minimised by the construction of meadow drains and the planting of indigenous vegetation on the side slopes and drains to reduce flow velocity of stormwater.
- Spoil from cuts may be used in existing erosion galleys.
- Stone pitching and gabions should be constructed at pipe culvert outlets.
- Accidental spills of contaminants onto the ground e.g. oil, concrete, fuel and chemicals should be removed together with the contaminated soil.
- If necessary an absorbent such as Peat Sorb should be used the aid in cleaning up the spill. The contaminated soil should be disposed of in an appropriate container, depending on its classification.
- Servicing and re-fuelling of vehicles must only be carried out at construction camp.

17 Worker Conduct

Code of Conduct for Construction Personnel:

Do not leave the construction site untidy and strewn with rubbish which will attract animal pests.
Do not set fires.
Do not cause any unnecessary, disturbing noise at the construction camp/site or at any designated worker collection/drop off points.
Do not drive a construction-related vehicle under the influence of alcohol.
Do not exceed the national speed limits on public roads or exceed the recommended speed limits on the site.
Do not drive a vehicle which is generating excessive noise or gaseous pollution (noisy vehicles must be reported and repaired as soon as possible).
Do not litter along the roadsides, including both the public and private roads.
Do not pollute any water bodies (whether flowing or not).
No member of the construction team is allowed to enter the areas outside the construction site.

18 Traffic Disturbances and Diversions

- Any traffic diversions must be undertaken with the approval of all relevant authorities and in accordance with all relevant legislation.
- Wherever possible, traffic diversion must only take place on existing disturbed areas and remain within the existing road reserve.
- Traffic diversion routes must be rehabilitated after use.

19 Vegetation

- Only vegetation falling directly on the route must be removed where necessary.
- Alien vegetation within the road reserve must be eradicated, and management measures must be implemented for future control of these species.
- Vegetation that has been removed from large areas (e.g. on traffic diversion routes) during construction must be replaced with indigenous vegetation after construction has been completed.

20 Waste Management

- All general, non-hazardous waste must be placed in a skip container and disposed of at a registered waste disposal site.
- The contractor is to ensure that the portable toilet facilities at the campsite are properly maintained and in working order.
- No disposal, or leakage, of sewage must occur on or near the site.
- All hazardous waste (e.g. oil, paint, empty lime bags, contaminated wash water, etc) must be stored in leakproof containers and disposed of at a registered hazardous waste disposal site.
- The contents of waste storage containers must, under no circumstances, be emptied to the surrounding area. In general, littering, discarding or burying of any materials is not allowed on site or along the route.
- Adequate waste receptacles must be available at strategic points around the construction camp and site for all domestic refuse and to minimise the occurrence of littering.
- Concrete rubble must be collected and disposed of as directed by the Project Manager.

- Each working area must be cleared of litter and building waste (e.g. rubble, wood, concrete packets etc) on completion of the day's work.
- Any spill around the container(s) should be treated as per Section C11 and C16.

PART D: DAYWORKS

This part of the Project Specifications deals with the provision for Dayworks in the Schedule of Quantities. Rates for Dayworks shall be entered in Schedule D of the Schedule of Quantities in accordance with the following specifications.

D. 1 SCOPE

Certain work may be carried out using rates tendered in the daywork schedule. A schedule of personnel, plant and equipment which may be necessary to perform work on a daywork basis is included in the schedule of quantities. The quantities used in the schedule are for tender evaluation purposes only and the use or not of these items shall not constitute a variation.
No work will be paid for as Dayworks without the written instruction or approval of the Engineer.

D. 2 TYPE OF WORK

The Engineer may order daywork in certain cases where it is necessary to vary or to extend the works due to new or unforeseen circumstances to such an extent that the tendered rates for specific items of work are no longer applicable, or where no suitable combination of tendered rates can be used to pay for such work.

As a general rule, applicable rates for additional work items will be agreed between the Contractor and the Engineer. Dayworks will only be used in exceptional circumstances.

D. 3 MATERIALS

Materials for use in works carried out under Daywork shall be purchased by the Contractor who shall also arrange for delivery to site, and shall be responsible for any other requirements associated with specific materials. A Provisional Sum has been allowed in Schedule D for Daywork materials. The Contractor shall enter a tendered percentage in the schedule to cover his handling costs and profit, as per other provisional and prime cost sums in this Contract.

Materials shall be paid for using the method described in the Pricing Data. No contract price adjustment will be applicable to materials.

The Contractor shall submit proof of ownership for any materials used in Dayworks with his dayworks claim to the Engineer. Further, if specific materials are required for Dayworks, quotations will be called for.

D. 4 CONSTRUCTION PLANT HIRE

Where daywork is ordered, the tendered rates for plant hire in Schedule D shall be used in calculating the payment due for any plant required to execute the daywork. If no rate is included in the schedule for a particular piece of equipment, and where no other rate or combination of rates would provide suitable compensation, then the daywork method of payment described in Clause 37.2.3 of the General Conditions of Contract 2004 edition will be used.

The tendered rates for each item of constructional plant shall include for all operating costs associated with the said item of plant. Such costs are deemed to include fuel, re-fuelling costs, lubrication and routine servicing /

maintenance, breakdowns and spares, all overhead costs, site management costs and administration costs. The tendered rates shall also include the plant operator and the general supervision of the plant while it is engaged in the dayworks.

D. 5 SALARIES AND WAGES OF WORKMEN

The salaries and wages of workmen executing daywork shall be paid for using the tendered rates in Schedule D. The tendered rates shall include for all costs associated with the employment of personnel, including salaries, wages, allowances, workmen's compensation, medical aid and pension contributions, Municipality levies and taxes, training costs and any costs associated with living on the site. The tendered rates shall also include for the transportation of the workmen to the site of the dayworks.

All overhead costs, administration costs, site management costs and the Contractor's profit are deemed to be covered by the Dayworks rates and no additions or mark ups will be made to the tendered rates.

The tendered rates shall also include any hand tools normally associated with the workmen's job description e.g. picks, shovels, hammers, saws, spirit levels, etc. The tendered rate for labourers shall also include for the casual supervision by a gang boss or foreman. Only when specifically called for by the Engineer, will payment be made for the use of a gang boss or foreman supervising on a continuous basis.

D. 6 MEASUREMENT AND PAYMENT

The following principles shall also apply to the measurement and payment of Dayworks.

The unit of measurement for plant shall be the number of vibroclock hours worked and each item of plant shall be fitted with a vibroclock, the cost of which shall be included in the rates. Excessive non-productive time when the engine is idling will not be paid for. Where there is ambiguity between the flywheel horsepower and mass of the machine, the flywheel horsepower shall govern the measurement category. Where width and mass are specified, mass shall govern the measurement category.

The Contractor's attention is drawn to the requirements of Sub-clauses 37.2.5 and 37.2.6 of the General Condition of Contract 2010 edition with regard to the submission of Dayworks claims.

PART E: OHSA 1993 HEALTH AND SAFETY SPECIFICATION

E1. SCOPE

This specification covers the health and safety requirements to be met by the Contractor to ensure a continued safe and healthy environment for all workers, employees and subcontractors under his control and for all other persons entering the site of works.

This specification shall be read with the Occupational Health and Safety Act (Act No 85 and amendment Act No 181) 1993, and the corresponding Construction Regulations 2003, and all other safety codes and specifications referred to in the said Construction Regulations.

In terms of the OHSA Agreement in Section C1.2.4 of the Contract document, the status of the Contractor as mandatory to the Employer (client) is that of an employer in his own right, responsible to comply with all provisions of OHSA 1993 and the Construction Regulations 2003.

This safety specification and the Contractor's own Safety Plan as well as the Construction Regulations 2003, shall be displayed on site or made available for inspection by all workers, employees, inspectors and any other persons entering the site of works.

The following are possible risks associated with this project:

- Working high above the ground on top and below the bridge, most of the time in a restricted environment with limited landings (working platforms)
- Working above a continuously flowing river and in an flood plain environment subject to flooding
- Lifting and lowering of materials and equipment from the ground to the bridge and vice versa, exposed to cross winds
- Steep and restricted access to the lower flood plain below the bridge
- Potentially dangerous existing services, i.e. gas lines, water and sewerage mains, electrical high voltage cables, on the bridge, buried and overhead
- Deep excavations in soils requiring shoring or reducing of slopes
- Blasting of hard rock or demolition of concrete
- High pressure during testing of the new rising main, which could result in potentially dangerous situations in the event of the pipeline of fittings failing
- Potentially harmful gasses when tying into the existing sewer mains
- Movement of construction vehicles on site, taking into consideration steep slopes, other traffic and existing services
- Exposure to possible injuries due to mishandling or failure of power and hand tools
- Falling debris, tools and materials from bridge
- Non-conformance to specifications with regards to fasteners and materials
- Risks related to general safety and security on site

Additional risks may arise from specific methods of construction selected by the Contractor which are not necessary covered in the above.

E2. DEFINITIONS

For the purpose of this contract the following shall apply:

(a) Employer" where used in the contract documents and in this specification, means the Employer as defined in the General Conditions of Contract and it shall have the exact same meaning as "client" as defined in the Construction Regulations 2003. "Employer" and "client" is therefore interchangeable and shall be read in the context of the relevant document.

(b) "Contractor" wherever used in the contract documents and in this specification, shall have the same meaning as "Contractor" as defined in the General Conditions of Contract.

In this specification the terms “principal contractor” and “contractor” are replaced with “Contractor” and “subcontractor” respectively.

For the purpose of this contract the Contractor will, in terms of OHSA 1993, be the mandatory, without derogating from his status as an employer in his own right.

(c) “Engineer” where used in this specification, means the Engineer as defined in the General Conditions of Contract. In terms of the Construction Regulations the Engineer may act as agent on behalf of the Employer (the client as defined in the Construction Regulations).

E3. TENDERS

The Contractor shall submit the following with his tender:

(a) a documented Health and Safety Plan as stipulated in Regulation 5 of the Construction Regulations. The Safety Plan must be based on the Construction Regulations 2003 and will be subject to approval by the Employer;

(b) a declaration to the effect that he has the competence and necessary resources to carry out the work safely in compliance with the Construction Regulations 2003;

(c) a declaration to the effect that he made provision in his tender for the cost of the health and safety measures envisaged in the Construction Regulations.

(d) Failure to submit the foregoing with his tender, will lead to the conclusion that the Contractor will not be able to carry out the work under the contract safely in accordance with the Construction Regulations.

E4. NOTIFICATION OF COMMENCEMENT OF CONSTRUCTION WORK

After award of the contract, but before commencement of construction work, the Contractor shall, in terms of Regulation 3, notify the Provincial Director of the Department of Labour in writing if the following work is involved:

(a) the demolition of structures and dismantling of fixed plant of height of 3,0m or more;
(b) the use of explosives;
(c) construction work that will exceed 30 days or 300 person-days;
(d) excavation work deeper than 1,0 m; or
(e) working at a height greater than 3,0 m above ground or landings.

The notification must be done in the form of the pro forma included under Section 9 (Forms to be Completed by Successful Tenderer) of the tender document.

A copy of the notification form must be kept on site, available for inspection by inspectors, Employer, Engineer, employees and persons on site.

E5. RISK ASSESSMENT

Before commencement of any construction work during the construction period, the Contractor shall have a risk assessment performed and recorded in writing by a competent person. (Refer Regulation 7 of the Construction Regulations 2003).

The risk assessment shall identify and evaluate the risks and hazards that may be expected during the execution of the work under the contract, and it shall include a documented plan of safe work procedures to mitigate, reduce or control the risks and hazards identified.

The risk assessment shall be available on site for inspection by inspectors, Employer, Engineer, subcontractors, employees, trade unions and health and safety committee members, and must be monitored and reviewed periodically by the Contractor.

E6. APPOINTMENT OF EMPLOYEES AND SUBCONTRACTORS

6.1 Health and Safety plan

The Contractor shall appoint his employees and any subcontractors to be employed on the contract, in writing, and he shall provide them with a copy of his documented Health and Safety Plan, or relevant sections thereof. The Contractor shall ensure that all subcontractors and employees are committed to the implementation of his Safety Plan.

6.2 Health and safety induction training

The Contractor shall ensure that all employees under his control, including subcontractors and their employees, undergo a health and safety induction training course by a competent person before commencement of construction work. No visitor or other person shall be allowed or permitted to enter the site of the works unless such person has undergone health and safety training pertaining to hazards prevalent on site.

The Contractor shall ensure that every employee on site shall at all times be in possession of proof of the health and safety induction training issued by a competent person prior to commencement of construction work.

E7. APPOINTMENT OF SAFETY PERSONNEL

7.1 Construction Supervisor

The Contractor shall appoint a full-time Construction Supervisor with the duty of supervising the performance of the construction work.

He may also have to appoint one or more competent employees to assist the construction supervisor where justified by the scope and complexity of the works.

7.2 Construction safety officer

Taking into consideration the size of the project and the hazards or dangers that can be expected, the Contractor shall appoint in writing a full-time or part-time Construction Safety Officer if so decided by the Inspector of the Department of Labour. The Safety Officer shall have the necessary competence and resources to perform his duties diligently.

Provision shall be made by the Contractor in his rates, to cover the cost of this dedicated construction safety officer appointed after award of the contract.

7.3 Health and safety representatives

In terms of Section 17 and 18 of the Act (OHSA 1993) the Contractor, being the employer in terms of the Act for the execution of the contract, shall appoint a health and safety representative whenever he has more than 20 employees in his employment on the site of the works. The health and safety representative must be selected from employees who are employed in a full-time capacity at a specific workplace.

The number of health and safety representatives for a workplace shall be at least one for every 100 employees.

The function of health and safety representative(s) will be to review the effectiveness of health and safety measures, to identify potential hazards and major incidents, to examine causes of incidents (in collaboration with his employer, the Contractor), to investigate complaints by employees relating to health and safety at work, to make representations to the employer (Contractor) or inspector on general matters affecting the health and safety of employees, to inspect the workplace, plant, machinery etc. on a regular base, to participate in consultations with inspectors and to attend meetings of the health and safety committee.

7.4 Health and safety committee

In terms of Sections 17 and 18 of the Act (OHSA 1993) the Contractor (as employer), shall establish one or more health and safety committee(s) where there are two or more health and safety representatives at a workplace. The persons selected by the Contractor to serve on the committee shall be designated in writing.

The function of the health and safety committee shall be to hold meetings at regular internals, but at least once every three months, to review the health and safety measures on the contract, to discuss incidents related to health and safety with the Contractor and the inspector, and to make recommendations regarding health and safety to the Contractor and to keep record of recommendations and reports made by the committee.

7.5 Competent persons

In accordance with the Construction Regulations the Contractor has to appoint in writing competent persons responsible for supervising construction work on each of the following work situations that may be expected on the site of the works.

(a) Risk assessment and induction training as described in Regulation 7 of the Construction Regulations;
(b) Fall protection as described in Regulation 8;
(c) Formwork and support work as described in Regulation 10;
(d) Excavation work as described in Regulation 11;
(e) Demolition work as described in Regulation 12;
(f) Scaffolding work as described in Regulation 14;

(g) Suspended platform operations as described in Regulation 15;
(h) Material hoists as described in Regulation 17;
(i) Batch plant operations as described in Regulation 18;
(j) Explosive powered tools as described in Regulation 19;
(k) Cranes as described in Regulation 20;
(l) Construction vehicle and mobile plant inspections on a daily basis by a
(m) competent person as described in Regulation 21(1);
(n) Control of all temporary electrical installation on the construction site as described in Regulation 22;
(o) Stacking and storage on construction sites as described in Regulation 26; and
(p) Inspections of fire equipment as described in Regulation 27.

A competent person may be appointed for more than one part of the construction work with the understanding that the person must be suitably qualified and able to supervise at the same time the construction work on all the work situations for which he has been appointed.

The appointment of competent persons to supervise parts of the construction work does not relieve the Contractor from any of his responsibilities to comply with all requirements of the Construction Regulations.

E8. RECORDS AND REGISTERS

In accordance with the Construction Regulations the Contractor is bound to keep records and registers related to health and safety on site for periodic inspection by inspectors, the Engineer, the Employer, trade union officials and subcontractors and employees. The following records and registers must be kept on site and shall be available for inspection at all times.

(a) A copy of the OHSA 1993 Construction Regulations 2003;
(b) A copy of this Health and Safety Specification;
(c) A copy of the Contractor's Health and Safety Plan (Regulation 4);
(d) A copy of the Notification of Construction Work (Regulation 3);
(e) A health and safety file in terms of Regulation 5(7) with inputs by the Construction Safety Officer (Regulation 6(7));
(f) A copy of the risk assessment described in Regulation 7;
(g) A full protection plan and the corresponding records of evaluation and training of employees working from elevated positions as described in Regulation 8;
(h) Drawings pertaining to the design of structures (Regulation 9(3)) and formwork and support work structures (Regulation 10(d)) must be kept on site;
(i) Pronouncement of the safety of excavations must be recorded in a register to be kept on site (Regulation 11(3)(h));
(j) A copy of the certificate of the system design for suspended platforms (Regulation 15(3));
(k) A notice must be affixed around the base towers of material hoists to indicate the maximum mass load, which may be carried at any one time by material hoists (Regulation 7(5));
(l) Maintenance records of material hoists and inspection results must be kept in a record book to be kept on site (Regulation 17(8));
(m) A record of any repairs to or maintenance of a batch plant must be kept on site (Regulations 18(9));
(n) A warning notice must be displayed in a conspicuous manner when and wherever an explosive powered tool is used (Regulation 19(2));

(o) A register for recording of findings by the competent person appointed to inspect construction vehicles and mobile plant (Regulation 21(1)(j)).

E9. CONTRACTORS RESPONSIBILITIES

For this contract the Contractor will be the mandatory of the Employer (Client), as defined in the Act (OHSA 1993), which means that the Contractor has the status of employer in his own right in respect of the contract. The Contractor is therefore responsible for all the duties and obligations of an employer as set out in the Act (OHSA 1993) and the Construction Regulations 2003.

Before commencement of work under the contract, the Contractor shall enter into an agreement with the Employer (Client) to confirm his status as mandatory (employer) for the contract under consideration.

The Contractor's duties and responsibilities are clearly set out in the Construction Regulations 2003, and are not repeated in detail but some important aspects are highlighted hereafter, without relieving the Contractor of any of his duties and responsibilities in terms of the Construction Regulations.

(a) Contractor's position in relation to the Employer (Client) (Regulation 4)

In accordance with Section 4 of the Regulations, the Contractor shall liaise closely with the Employer or the Engineer on behalf of the Employer, to ensure that all requirements of the Act and the Regulations are met and complied with.

(b) The Principal Contractor and Contractor (Regulation 5)

The Contractor is in terms of the definition in Regulation 2(b) the equivalent of Principle Contractor as defined in the Construction Regulations, and he shall comply with all the provisions of Regulation 5.

Any subcontractors employed by the Contractor must be appointed in writing, setting out the terms of the appointment in respect of health and safety. An independent subcontractor shall however provide and demonstrate to the Contractor a suitable, acceptable and sufficiently documented health and safety plan before commencement of the subcontract. In the absence of such a health and safety plan the subcontractor shall undertake in writing that he will comply with the Contractor's safety plan, the health and safety specifications of the Employer and the Construction Regulations 2003.

(c) Supervision of construction work (Regulation 6)

The Contractor shall appoint the safety and other personnel and employees as required in terms of Regulation 6 and as set out in paragraph 7 above. Appointment of those personnel and employees does not relieve the Contractor from any of the obligations under Regulation 6.

(d) Risk assessment (Regulation 7)

The Contractor shall have the risk assessment made as set out in paragraph 7 above before commencement of the work and it must be available on site for inspection at all times. The Contractor shall consult with the health and safety committee or health and safety representative(s) etc. on a regular basis to ensure that all employees, including subcontractors under his control, are informed and trained by a competent person regarding health hazards and related work procedures.

No subcontractor, employee or visitor shall be allowed to enter the site of works without prior health and safety induction training, all as specified in Regulation 7.

(e) Fall protection (Regulation 8)

Fall protection, if applicable to this contract shall comply in all respects with Regulation 8 of the Construction Regulations.

(f) Structures (Regulation 9)

The Contractor will be liable for all claims arising from collapse or failure of structures if he failed to comply with all the specifications, project specifications and drawings related to the structures, unless it can be proved that such collapse or failure can be attributed to faulty design or insufficient design standards on which the specifications and the drawings are based.

In addition the Contractor shall comply with all aspects of Regulation 9 of the Construction Regulations.

(g) Formwork and support work (Regulation 10)

The Contractor will be responsible for the adequate design of all formwork and support structures by a competent person.

All drawings pertaining to formwork shall be kept on site and all equipment and materials used in formwork, shall be carefully examined and checked for suitability by a competent person.

The provisions of Regulation 10 of the Construction Regulations shall be followed in every detail.

(h) Excavation work (Regulation 11)

It is essential that the Contractor shall follow the instructions and precautions in the Standard Specifications and Project Specifications as well as the provisions of the Construction Regulations to the letter as unsafe excavations can be a major hazard on any construction site. The Contractor shall therefore ensure that all excavation work is carried out under the supervision of a competent person, that inspections are carried out by a Professional Engineer or Technologist, and that all work is done in such a manner that no hazards are created by unsafe excavations and working conditions.

Supervision by a competent person will not relieve the Contractor from any of his duties and responsibilities under Regulation 11 of the Construction Regulations.

(i) Demolition work (Regulation 12)

Whenever demolition work is included in a contract, the Contractor shall comply with all the requirements of Regulation 12 of the Construction Regulations. The fact that a competent person has to be appointed by the Contractor does not relieve the Contractor from any of his responsibilities in respect of safety of demolition work.

(j) Tunneling (Regulation 13)

The Contractor shall comply with Regulation 13 wherever tunnelling of any kind is involved.

(k) Scaffolding (Regulation 14)

The Contractor shall ensure that all the provisions of Regulation 14 of the Construction Regulations are complied with. [Note: Reference in the Regulations to "Section 44 of the Act" should read "Section 43 of the Act"].

(l) Suspended platforms (Regulation 15)

Wherever suspended platforms will be necessary on any contract, the Contractor shall ensure that copies of the system design issued by a Professional Engineer are submitted to the Engineer for inspection and approval. The Contractor shall appoint competent persons as supervisors and competent scaffold erectors, operators and inspectors and ensure that all work related to suspended platforms are done in accordance with Regulation 15 of the Construction Regulations.

(m) Boatswain's chains (Regulation 16)

Where boatswain's chains are required on the construction site, the Contractor shall comply with Regulation 16.

(n) Material Hoists (Regulation 17)

Wherever applicable, the Contractor shall comply with the provisions of Regulation 17 to the letter.

(o) Batch plants (Regulation 18)

Wherever applicable, the Contractor shall ensure that all lifting machines, lifting tackle, conveyors, etc. used in the operation of a batch plant shall comply with, and that all operators, supervisors and employees are strictly held to the provisions of Regulation 18. The Contractor shall ensure that the General Safety Regulations (Municipality Notice R1031 of 30 May 1986), the Driven Machinery Regulations (Municipality Notice R295 of 26/2/1988) and the Electrical Installation Regulations (Municipality Notice R2271 of 11/10/1995) are adhered to by all involved.

In terms of the Regulations, records of repairs and maintenance shall be kept on site.

(p) Explosive powered tools (Regulation 19)

The Contractor shall ensure that, wherever explosive-powered tools are required to be used, all safety provisions of Regulation 19 are complied with.

It is especially important that warning notices are displayed and that the issue and return of cartridges and spent cartridges be recorded in a register to be kept on site.

(q) Cranes (Regulation 20)

Wherever the use of tower cranes becomes necessary, the provisions of Regulation 20 shall be complied with.

(r) Construction vehicles And mobile plant (Regulation 21

The Contractor shall ensure that all construction vehicles and plant are in good working condition and safe for use, and that they are used in accordance with their design and intended use. The vehicles and plant shall only be operated by workers or operators who have received appropriate training, all in accordance with all the requirements of Regulation 21.

All vehicles and plant must be inspected on a daily basis, prior to use, by a competent person and the findings must be recorded in a register to be kept on site.

(s) Electrical installation and machinery on construction sites (Regulation 22)

The Contractor shall comply with the Electrical Installation Regulations (Municipality Notice R2920 of 23 October 1992) and the Electrical Machinery Regulations (Municipality Notice R1953 of 12 August 1993). Before commencement of construction, the Contractor shall take adequate steps to ascertain the presence of, and guard against dangers and hazards due to electrical cables and apparatus under, over or on the site.

All temporary electrical installations on the site shall be under the control of a competent person, without relieving the Contractor of his responsibility for the health and safety of all workers and persons on site in terms of Regulation 22.

(t) Use of temporary storage of flammable liquids on construction sites (Regulation 23)

The Contractor shall comply with the provisions of the General Safety Regulations (Municipality Notice R1031 of 30 May 1986) and all the provisions of Regulation 23 of the Construction Regulations to ensure a safe and hazard-free environment to all workers and other persons on site.

(u) Water environments (Regulation 24)

Where construction work is done over or in close proximity to water, the provisions of Regulation 24 shall apply.

(v) Housekeeping on Construction sites (Regulation 25)

Housekeeping on all construction sites shall be in accordance with the provisions of the environment Regulations for workplaces (Municipality Notice R2281 of 16 October 1987) and all the provisions of Regulation 25 of the Construction Regulations.

(w) Stacking and storage on construction sites (Regulation 26)

The provisions for the stacking of articles contained in the General Safety Regulations (Municipality Notice R1031 of 30 May 1986) as well as all the provisions Regulation 26 of the Construction Regulations shall apply.

(x) Fire precautions on construction sites (Regulation 27)

The provisions of the Environmental Regulations for Workplaces (Municipality Notice R 2281 of 16 October 1987) shall apply.

In addition the necessary precautions shall be taken to prevent the incidence of fires, to provide adequate and sufficient fire protection equipment, sirens, escape routes etc. all in accordance with Regulation 27 of the Construction Regulations.

(y) Construction welfare facilities (Regulation 28)

The Contractor shall comply with the construction site provisions as in the Facilities Regulations (Municipality Notice R1593 of 12 August 1988) and the provisions of Regulation 28 of the Construction Regulations.

(z) Non-compliance with the Construction Regulations 2003

The foregoing is a summary of parts of the Construction Regulations applicable to all construction projects.

The Contractor, as employer for the execution of the contract, shall ensure that all provisions of the Construction Regulations applicable to the contract under consideration are complied with to the letter.

Should the Contractor fail to comply with the provisions of the Regulations 3 to 28 as listed in Regulation 30, he will be guilty of an offence and will be liable, upon conviction, to the fines or imprisonment as set out in Regulation 30. The Contractor is advised in his own interest to make a careful study of the Act and the Construction Regulations as ignorance of the Act and the Regulations will not be accepted in any proceedings related to non-conformance to the Act and the Regulations.

E10. MEASUREMENT AND PAYMENT

10.1 Principles

It is a condition of this contract that Contractors, who submit tenders for this contract, shall make provision in their tenders for the cost of all health and safety measures during the construction process. All associated activities and expenditure are deemed to be included in the Contractor's tendered rates and prices.

(a) Safety personnel

The Construction Supervisor, the Construction Safety Officer, Health and Safety Representatives, Health and Safety Committee and Competent Persons shall be members of the Contractor's personnel, and no additional payment will be made for the appointment of such safety personnel.

(b) Records and Registers

The keeping of health and safety-related records and registers as described in 8 is regarded as a normal duty of the Contractor for which no additional payment will be considered, and which is deemed to be included in the Contractor's tendered rates and prices.